

# Taan Forest Ltd & LP

## Forest Stewardship Plan Supporting Information

2018



# Table of Contents

Table of Contents .....	i
List of Figures .....	iii
1.0 Preamble .....	1
2.0 Application .....	1
Protected Area Impacts .....	1
Legal Surveys .....	1
3.0 Results & Strategies .....	1
Clarification .....	1
Cultural and Social Objectives .....	2
Haida Traditional Heritage Features .....	2
<i>Applicable HTHFs</i> .....	2
Haida Traditional Forest Features .....	3
<i>Class 1 HTFFs</i> .....	3
<i>Class 2 HTFFs</i> .....	3
Cedar Retention.....	3
<i>15% Cedar Retention Requirements</i> .....	3
<i>20% Cedar Regeneration Requirements</i> .....	5
<i>Western Yew</i> .....	7
<i>Monumental Cedars</i> .....	7
Aquatic Habitats (LUO) & Riparian Areas (FRPA) .....	8
<i>Stream Riparian Classifications and Management – LUO vs. FRPA</i> .....	8
<i>Upland Stream Areas</i> .....	10
<i>Sensitive Watersheds</i> .....	11
<i>Temperature-Sensitive Streams</i> .....	12
<i>Community Watersheds</i> .....	12
Biodiversity .....	12
<i>Ecological Representation</i> .....	12
<i>Adjacency</i> .....	13
<i>Northern Goshawk, Great Blue Heron, and Northern Saw-Whet Owl</i> .....	13
<i>Marbled Murrelet Nesting Habitat</i> .....	13
<i>Northern Goshawk Habitat</i> .....	13
<i>Great Blue Heron Nesting Habitat</i> .....	14
<i>Black Bear Dens</i> .....	14
Annual Reporting and Data Submission .....	14

Windthrow Management & Management Prescriptions .....	14
Tracking Ledgers - General .....	15
<b>4.0 Climate Change .....</b>	<b>15</b>
<b>5.0 Measures to Prevent Impact on Natural Range Barriers .....</b>	<b>15</b>
<b>6.0 Stocking Standards .....</b>	<b>16</b>
Stocking Standards - General .....	16
Single-Entry Dispersed Retention System Standards .....	16
Stocking Standards Application .....	16
Ecologically Acceptable Species .....	16
Minimum Stocking Standard Cedar Content (MSSc) .....	17
Free-Growing Heights .....	17
Minimum Inter-Tree Distance Exceptions .....	18
Mixed Conifer – Hardwood Management .....	18
<i>Free-Growing Survey System</i> .....	18
<b>FSP implementation .....</b>	<b>18</b>
<b>Appendix .....</b>	<b>19</b>
Appendix A: Taan Watershed Tables.....	A-1
Appendix B: 2016 Taan Watershed Sub-basin Hydro Recovery Table Feb14, 2017 .....	B-1
Appendix C: Active Fluvial Units updated 2016 .....	C-1
Appendix D: Assessment Form - Windthrow Assessment Summary (Feb '13) .....	D-1
Appendix E: Field Card - Windthrow Assessment (Nov '15) .....	E-1
Appendix F: Field Card - Windthrow Prescription (Feb '12).....	F-1
Appendix G: SOP - Monumentals (Nov '16) .....	G-1
Appendix H: VQOs.....	H-1
Appendix I: Windthrow Monitoring Form (Sept '16).....	I-1
Appendix J: SOP - Planning (Oct '17) .....	J-1
Appendix K: Haida Gwaii Licensees’ FSPs Implementation Agreement.....	K-1
Appendix L: Taan Forest 2018 Haida Gwaii TSA 25 Cedar Partition Volume Tracking and Reporting.....	L-1
Appendix M: Training Requirement Matrix .....	M-1

## List of Tables

<a href="#">Table 1: Minimum Post-Harvest Cedar Composition, Based on Pre-Harvest Cedar Composition</a>	6
<a href="#">Table 2: LUO vs. FRPA Stream Management Comparison</a>	8
<a href="#">Table 3: Stocking Standards Application</a>	16
<a href="#">Table 4: 2016 Taan Area Available in Sensitive Watersheds Feb 15, 2017</a>	A-1
<a href="#">Table 5: Planned Block Shapes as of Jan 2017 (subject to change)</a>	B-1
<a href="#">Table 6: Stream Channel Types</a>	C-4

## List of Figures

<a href="#">Figure 1: 15% cedar retention calculation example</a>	4
<a href="#">Figure 2: VQO Overview Graham North compact</a>	H-1
<a href="#">Figure 3: VQO Overview Graham South compact</a>	H-2
<a href="#">Figure 4: VQO Overview Moresby-Louise compact</a>	H-3



# Supporting Information

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## 1.0 Preamble

This FSP Supporting Information document is meant to assist reviewers in the FSP approval process. Where necessary, rationales have been provided for results and strategies within the FSP that may require added clarification and background info, for FSP reviewers to better understand the intent and direction proposed by the Plan Holder.

## 2.0 Application

### Protected Area Impacts

In general, it is understood that Plan Holder operations must factor in adjacent landholders and that operations within the Plan Holder's tenures should not adversely affect areas outside of the Plan area, including Parks or Protected Areas. As such, the Plan Holder will plan their operations to factor in adjacent landholders and the values that may potentially be affected. Any management strategies or actions implemented to protect adjacent landholders will be confined to the Plan area (i.e., treatments will not occur outside of the FSP Area).

Where the Plan Holder operates near other stakeholders or landholders, the standard approach taken will be to contact the stakeholder/landholder early in the development process and work proactively to ensure that stakeholder/landholder concerns are considered.

### Legal Surveys

Where the Plan Holder proposes development areas near a Protected Area or other property/tenure boundary, it is incumbent on the Plan Holder to ensure that they are not operating outside of the Plan area and do not encroach on Protected Areas or other tenures. This is a requirement established under the Forest Act, and is not an objective to be addressed under the FSP. When the Plan Holder commences development adjacent to a Protected Area or other property/tenure boundary, the first issue they will address is the location of the tenure boundary, utilizing original boundary descriptions and locating blazes and pins in the field. Newer boundaries such as those along Protected Areas and cedar stewardship areas will use commercial-grade GPS equipment. In addition to spatially locating boundaries, the Plan Holder will typically contact potentially affected stakeholders and work collaboratively to ensure that their management concerns are addressed (e.g., offer to meet with adjacent tenure holders to field check boundary locations).

## 3.0 Results & Strategies

### Clarification

"Operational Feasibility" is added to sections of the FSP including CMT and monumental cedar management. This was added as a consideration for planners and the Integrated Stewardship Team during an intergovernmental process required when modifying a CMT or monumental reserve or removing a Monumental Cedar or CMT. It was specifically added for situations where a strategy within the HGLUOO could be used to modify the reserve or remove the CMT or monumental, but the environmental impact, cultural loss and/or feasibility of implementing the strategy is unnecessary.

An example is a CMT or monumental located near the end of a road. The reserve and management

zone will make logging the area behind the reserve impossible, or impracticable (high costs, high site impact from machinery etc). The CMT or Monumental could be removed utilizing the HGLUOO strategy that it could be removed for “a road”. Planning could push the road forward and the tree would be removed. However extra costs and more site impact is a result from adding unnecessary road, only to remove the CMT or monumental within HGLUOO objectives. A consideration of “Operational Feasibility” to remove the tree without unnecessarily building more road, would allow for access to the area.

## Cultural and Social Objectives

The Plan holder has Certified Cultural Feature Identification surveyors to identify and inventory Haida Cultural Features. These surveyors have passed both written and practical examinations (and obtain 65% minimum on both to pass) created by the Council of Haida Nation. Examinations are 1.5 days in length and include testing for CMT identification, monumental cedar identification, cultural plant identification, survey methodology, and standards and ecosystem classification.

While not a requirement of the Plan Holder’s CFI surveyors is preferred to be of Haida Heritage to complete the field work. At this time the Plan Holder surveyors are all of Haida Heritage.

The Cultural Features Identification Survey (CFIS) program also includes a quality assurance/audit to ensure that the quality of surveys remains consistently high. The frequency and timing of the audits is dependent of the Council of Haida Nation.

Ledger – Taan utilizes a spatially based tracking ledgers to track: harvesting area, hydrological recovery area, total area of upland stream area, % hydrological recovery, % hydrological recovery balance, sensitive watershed available area to harvest, MAMU habitat by landscape unit, and Ecological Representation by Land scape Unit. These ledgers are updated quarterly. The most recent example at the time of submission of this FSP can be found in the Appendix.

## Haida Traditional Heritage Features

### *Applicable HTHFs*

The Council of the Haida Nation’s Cultural Features Identification Survey dictates that when potential HTHFs are identified during a survey, an independent Archaeological Impact Assessment (AIA) must be conducted. Where AIAs are completed, it is standard practice for the archaeological report to indicate the cultural significance of any features that are identified. Therefore, the AIA will be considered the source for determining the significance of the identified feature and whether it is ultimately considered an HTHF (Schedule 2 of the LUO includes a list of features determined to be of cultural significance to the Haida Nation).

### Karst

“Karst Features” are identified in the LUO as Class 2 HTHFs, and have results specific to the LUO Objectives for HTHFs. Under the LUO, Karst Features are not well defined and would therefore include all potential karst occurrences.

“Karst Resource Features” have also been established under GAR, which includes a more specific definition. Additional results have been specified for the FRPA requirements.

If a karst occurrence meets the definition of Karst Resource Feature as designated under the GAR Order, it will be managed to the higher standard, which will ensure that it is not damaged or rendered ineffective.

## Haida Traditional Forest Features

### *Class 1 HTFFs*

Tree length measurement method will be based on the development area and not individual features. For example, there will not be a mix of measurement methods in a development area. If ecosystems area used, ecosystems are used for the entire development area. The heights of the tree will be dependent on the ecosystems that each feature is in.

If the tallest tree is used, the tallest tree will be used for the entire development area. The tallest mature or Old Growth Tree adjacent each feature will be used to determine tree height.

### *Class 2 HTFFs*

To be consistent with the LUO, the establishment of stand level retention will be one of the strategies employed to maintain the integrity of the HTFF. The use of stand level retention will be at the discretion of the signing Forester and will be detailed in the Site Plan. At a minimum stand level retention will include shade trees adjacent the feature to protect and may include the falling of larger trees of economic value or that may endanger the Class II Forest feature, provide the Class II Forest Feature is still protected.

## Cedar Retention

### *15% Cedar Retention Requirements*

The Plan Holder has implemented strategies in the FSP to meet the objective. During development of the block, if it is obvious to the supervising engineer that the block composition exceeds 6.20 a) or b) then a minimum 15% will be retained of a similar cedar composition. If it is not obvious to the supervising engineer the weighted cedar retention requirements will be calculated using the inventory mapping information available. An example to illustrate such calculations is provided in Figure 1 below.

Figure 1: 15% cedar retention calculation example

### Sample Development Area

Development Area = 35.0ha, consisting of 3 inventory polygons

Polygon A= 15.0ha - Inventory= C<sub>10</sub>

Polygon B = 10.0ha - Inventory= H<sub>5</sub>B<sub>5</sub>

Polygon C = 10.0ha - Inventory = H<sub>5</sub>C<sub>5</sub>

No-harvest zones established for Type I Fish Habitat= 3.5ha (Inventory = C<sub>10</sub>) Monumental Cedar No-harvest zone= 2.5ha (Inventory = H<sub>5</sub>C<sub>5</sub>)

### Weighted Cedar Content Calculation

The weighted pre-harvest cedar composition for the Development Area is calculated as follows:

Cedar % = (sum areas of inventory polygons \* associated % cedar content)/area of Development Area

= [(Polygon A \* Cw inv. for A) + (Polygon B \* Cw inv. for B) + (Polygon C \* Cw inv. for C)]/ area of Development Area

= [(15.0ha\*100%) + (10.0ha\*0%) + (10.0ha\*50%)]/35.0ha

= [(15.0 + 0 + 5.0ha)]/35.0ha

= 20.0ha/35.0ha

= 57% = pre-harvest combined cedar content for the Development Area (or 20.0ha, measured in area)

Therefore, as the Development Area is > 10.0ha and the combined pre-harvest cedar content is > 30%, the 15% cedar retention requirement applies.

### Calculation of Cedar Area Required

In order to meet the cedar retention requirement, Plan Holder must retain a minimum of 15% cedar, measured in hectares, consistent with the FSP Strategies. For the example above, the minimum cedar retention area required would be calculated as follows:

The minimum Cedar Retention Area required = 15% \* the weighted cedar content for the Development Area. As calculated above, the weighted cedar content was 57%, or 20.0ha

= 15%\*20.0ha

= 3.0ha

Therefore, for the Development Area, 3.0ha of cedar area must be reserved (i.e., 3.0ha of C<sub>10</sub> inventory; or 6.0ha of H<sub>5</sub>C<sub>5</sub>).

### Establishing Cedar Reserves

In this example, there are two retention areas already established. The sum of the weighted cedar retention areas associated with the established retention areas is calculated as follows:

Cedar content for Type I Fish Habitat no-harvest zone = (area\* cedar inventory for polygon)

= 3.5ha\*100%

= 3.5ha

Cedar content for Monumental Cedar no-harvest zone = (area\* cedar inventory for polygon)

= 2.5ha\*50%

=1.25ha

Therefore, the total weighted area of existing cedar retention areas = 3.5 + 1.25ha = 4.75ha

### Summary

Given that there are > 3.0ha of cedar retention areas established for the Development Area and that both of the designated cedar retention areas are greater than 1.0ha in size, for this example, provided that the prescribing Forester confirms that the cedar retention stands contain a range of diameters of cedar that are representative of the pre-harvest stand, all of the strategies for the 15% cedar retention requirement are deemed to be met.

With regards to the strategy for retaining a range of cedar representative of the pre-harvest area, the Plan Holder will do this by selecting areas of similar species and stand characteristics as the harvest area. Where the prescribing Forester cannot easily determine that 15% weighted cedar is retained, the weighted cedar area retained will be calculated as above to ensure the objective is met. It will be left to the prescribing Forester to ensure that the cedar retention stands selected to meet the 15% requirement are representative of the pre-harvest stands, and this should be documented within the Site Plan.

### *20% Cedar Regeneration Requirements*

The Plan Holder will calculate this strategy by defining “composition” based on live stems per hectare of Red and Yellow Cedar (as indicated in the cruise compilation), rather than using a volumetric approach (use of sph is consistent with previous MSSc procedures).

Specific rationales for cedar retention objective are provided (in FSP section) as follows:

*Where development areas have pre-harvest cedar (western redcedar and yellow cedar) composition greater than 20% in the harvested area, as indicated in the cruise compilation (measured in percent of cedar sph, not including dead potential or dead useless), then the Plan Holder will regenerate the area according to the minimum post-harvest cedar composition and strategies listed below.*

In regards to the use of stem per hectare (sph) versus volume (m<sup>3</sup>) or basal area (m<sup>2</sup>), it was thought that sph would provide the most accurate picture of the timber composition on site; using volume or basal area may have resulted in varying percentages for similar blocks. With regards to the removal of dead potential and dead useless from the cruise information (i.e., net-merch volume), it was determined that they should not be included in the calculation as they are no longer contributing to the Mean Annual Increment of the site. This portion of the LUO objective is focused on cedar regeneration—replacing live trees with live trees. Using the net-merch volume is the most logical and consistent approach for achieving this objective.

*The cedar commitment will be determined on a cutblock by cutblock basis. The cedar regeneration requirement for a cutblock will be calculated by multiplying the NAR times the appropriate Minimum Post-Harvest Cedar Composition, as indicated in Table 1 below. Location of planted cedar within the cutblock will be at the discretion of the prescribing Forester, and consistent with approved stocking standards.*

**Table 1: Minimum Post-Harvest Cedar Composition, Based on Pre-Harvest Cedar Composition**

Pre-Harvest Cedar Composition %	Minimum Post-Harvest Cedar Composition (sph)
20–29	100
30–39	150
40–49	175
50–59	200
60–69	250
70–79	300
80–89	350
90–100	400

The Net Area to be Reforested (NAR) is used as this is the only area that will be restocked. All reserves and NPUNN will not be restocked. Table 1 was established based on the former Cedar Policy for the Haida Gwaii Forest District, with increases to the policy standards for the top two pre-harvest composition categories.

The location for planting the required cedar has been left up to the prescribing Forester, so that they can maximize site productivity by planting the cedar in the most desirable locations.

The use of naturals will be encouraged, and will count towards the final survey of cedar.

The Plan Holder is committed to protecting planted trees as well as monitoring them for survival. The 80% survival target was established as a reasonable benchmark to initiate fill planting. By allowing up to 20% mortality of planted cedar, the Plan Holder is afforded a reasonable amount of operational flexibility. The 20% leeway in survival will also temper any variation or anomalies that come about during surveys.

*a) Cedar acceptability criteria will be as follows:*

- i) Regenerated cedar will only be accepted if they are of good form and vigour*
- ii) Regenerated cedar will only be accepted if they are  $\geq 1.2m$  tall.*

Acceptability criteria are provided to support the fact that the Plan Holder is working to establish cedar regeneration so that the replanted trees will be reasonably expected to form part of the future stand. While the cedar obligation is not part of a Free-Growing Survey, the acceptability criteria are much the same. Acceptability criteria are based on the Free Growing tree damage criteria as defined in the Ministry of Forests’ Establishment to Free Growing Guidebook for the Vancouver Forest Region-V2.3.

The 1.2m minimum height is provided to ensure that the cedar regeneration is above deer browse height and beyond the need for protection.

While the cedar obligation resembles a free-growing survey in some aspects, it is a different, stand-alone obligation, and will be managed accordingly. The obligation due date has been established so that the Plan Holder is encouraged to meet the cedar regen obligation as early as possible, but still has enough time to allow for fill planting and stand tending activities, if required.

It should be noted that while there will be a minimum post-harvest cedar composition calculated for the block, the final amount of cedar established may not always meet the requirement. Provided that the Plan Holder has shown due diligence in attempting to re-establish a cedar composition (i.e., planted, protected, surveyed, fill planted once) then the obligation will be deemed fulfilled based on

the amount of cedar that have been established.

*The cedar regeneration requirement for a given cutblock may be lower than those set in FSP, provided that the new requirement is consistent with the outcome of a completed intergovernmental process.*

- a) For areas that have been planted with red and/ or yellow cedar, where the combined cedar content falls below 80% of the Minimum Post-Harvest Cedar Composition requirement, the area will be fill-planted once. Additional fill planting may be required provided that:

The fill planting is required because of a catastrophic failure such as fire, insect damage or stock health and/ or

Survey by a Taan Forester and or his/her representative indicates that any newly planted cedar will survive and be part of the Free Growing Stand

An intergovernmental process option was added to the Cedar Regeneration Section, to allow the Plan Holder the option of addressing exceptional circumstances, for example other objectives established under the LUO.

### ***Western Yew***

The Plan Holder's objective is to protect as many as Western Yew trees as possible. The Licensee wishes to target protection of 100% of individual Western Yew on a development area level. This target can be tracked by comparing the pre-harvest and post-harvest mapping and recording of Western Yew occurrences. The Plan holder will complete the following to protect Western Yew trees in development areas:

- a) Target 100% retention of all yew trees in a development area;
- b) Fall and yard away from yew trees;
- c) Retain non-merchantable wind-firm timber around yew trees;
- d) In cable areas, set cable corridors to minimize impact to yew trees;
- e) If yew trees must be cut down for safety purposes, leave a high stump and as many branches as possible;
- f) During engineering of development area, retain as many yew as possible within reserves and retention areas;
- g) During engineering, set up yew management areas where larger non-yew trees will be tipped out the area with little or no machine impact in the management area;
- h) Strive to use and develop alternate silviculture and harvest systems that will minimize impact to yew trees where there are high concentrations of these trees.

### ***Monumental Cedars***

The Licensee will do the following to track the harvesting of Monumental Cedars and provide them to the Haida Nation (refer to Taan's Monumental Cedar SOP in Appendix):

- a) Monumental Cedars will be identified during the block planning stage by certified CFI surveyors;

## Aquatic Habitats (LUO) & Riparian Areas (FRPA)

### *Stream Riparian Classifications and Management – LUO vs. FRPA*

There is significant “overlap” between the requirements under the LUO and FRPA (including the FPPR). For most objectives, reconciling the differences between the two is straightforward. However, there is significant conflict between the LUO and FRPA regarding stream classification, and to a lesser extent, stream-management requirements.

The LUO and FRPA both establish stream classification systems, which do not correlate 100% of the time. Both also establish reserve and management zones, which again, do not correlate exactly (FRPA zones are measured in meters and LUO zones are measured in tree-lengths, which are linked to site series and seral stage). Lastly, the LUO and FRPA both establish restrictions and management requirements within riparian areas, but again, these do not necessarily correlate.

FRPA classify streams as follows:

A stream that is a fish stream or is located in a community watershed has the following riparian class:

- a) S1A, if the stream averages, over a one km length, either a stream width or an active flood plain width of 100 m or greater;
- b) S1B, if the stream width is greater than 20 m but the stream does not have a riparian class of S1A;
- c) S2, if the stream width is not less than 5 m but not more than 20 m;
- d) S3, if the stream width is not less than 1.5 m but is less than 5 m;
- e) S4, if the stream width is less than 1.5 m.

A stream that is not a fish stream and is located outside of a community watershed has the following riparian class:

- a) S5, if the stream width is greater than 3 m;
- b) S6, if the stream width is 3 m or less.

**Table 2**, below, provides a brief comparison of the riparian requirements between the LUO and FRPA. For analysis purposes, the tree-length height for LUO streams was assumed to be 40m, based on an average tree-height for zonal sites across all BEC units and seral stages. If anything, this assumption is conservative, as most riparian areas are likely richer than zonal sites, resulting in taller tree-heights.

**Table 2** shows that in most cases, the riparian reserve requirements meet or exceed those established under FRPA, especially for Type I and II Fish Habitat streams.

**Table 2: LUO vs. FRPA Stream Management Comparison**

	Stream Class	RRZ / No-Harvest Zone	RMZ	RMA	RMZ BA Retention
Comparable large fish stream classes and management zones (LUO vs. FRPA)	FRPA - S1	50m	20m	70m	0–100
	FRPA - S2	30m	20m	50m	0–100
	FRPA - S3	20m	20m	40m	0–100
	LUO - Type I Fish Habitat	2.0 tree-lengths (80m)	-	2.0 tree-length (80m)	N/A
Comparable small	FRPA - S4	-	30m	30m	0–100



fish stream classes and management zones (LUO vs. FRPA)	LUO - Type II Fish Habitat	1.0 tree-length (40m)	0.5 tree-length (20m)	1.5 tree-lengths (60m)	~100%
Comparable “non-fish” stream classes and management zones (LUO vs. FRPA)	FRPA - S5	-	30m	30m	0–100
	FRPA - S6	-	20m	20m	0–100
	LUO - Upland Stream	-	-	30m	N/A

Two realistic options exist when trying to develop results/ strategies to address both the LUO and the FRPA objectives: follow the LUO only, or try to develop a process to simultaneously meet the conflicting objectives of both the LUO and FRPA.

The FSP has been developed to address all the stream riparian requirements using the LUO approach, except for where a LUO approach does not address a stream, as is the case for S5 and S6 streams. These examples will be managed as per FRPA (and FPPR) requirements.

#### Wetlands & Lakes

The FSP was developed for when wetlands and lakes meet the definition of Type I or II Fish Habitat, which will be managed as such. However, in all other cases, wetlands and lakes will be managed as per FRPA (and FPPR) requirements.

FRPA classify wetlands as follows:

Wetlands have the following riparian classes:

- a) W1, if the wetland is greater than 5 ha in size;
- b) W2, if the wetland is not less than 1 ha and not more than 5 ha in size and is in one of the following biogeoclimatic zones or subzones:
  - i. Ponderosa Pine;
  - ii. Bunch Grass;
  - iii. Interior Douglas-fir, very dry hot, very dry warm or very dry mild;
  - iv. Coastal Douglas-fir;
  - v. Coastal Western Hemlock, very dry maritime, dry maritime or dry subarctic;
- c) (c) W3, if the wetland is not less than 1 ha and not more than 5 ha in size and is in a biogeoclimatic zone or subzone other than one referred to in paragraph (b);
- d) (d) W4, if the wetland is
  - i. not less than 0.25 ha and less than 1 ha in size and is in a biogeoclimatic zone or subzone referred to in paragraph (b) (i), (ii) or (iii), or
  - ii. not less than 0.5 ha and less than 1 ha in size and is in a biogeoclimatic zone or subzone referred to in paragraph (b) (iv) or (v).
  - iii.

Despite subsection (1), an area is to be treated as a single wetland with a riparian class of W5 if

- a) the area contains

- i. two or more W1 wetlands located within 100 m of each other,
  - ii. a W1 wetland and one or more non-W1 wetlands, all of which are within 80 m of each other, or
  - iii. two or more non-W1 wetlands located within 60 m of each other, and
- b) the combined size of the wetlands, excluding the upland areas, is 5 ha or larger.

FRPA defines Lakes as follows:

Lakes have the following riparian classes:

- a) L1-A, if the lake is 1 000 ha or greater in size;
- b) L1-B, if
  - i. the lake is greater than 5 ha but less than 1 000 ha in size, or
  - ii. the minister designates the lake as L1-B;
- c) L2, if the lake is not less than 1 ha and not more than 5 ha in size and is located in a biogeoclimatic zones or subzone that is
  - i. Ponderosa Pine,
  - ii. Bunch Grass,
  - iii. Interior Douglas-fir, very dry hot, very dry warm or very dry mild,
  - iv. Coastal Douglas-fir, or
  - v. Coastal Western Hemlock, very dry maritime, dry maritime or dry subarctic;
- d) L3, if the lake is not less than 1 ha and not more than 5 ha in size and is in a biogeoclimatic zone or subzone other than one referred to in paragraph (c);
- e) L4, if the lake is
  - i. not less than 0.25 ha and not more than 1 ha in size and is in a biogeoclimatic zone or subzone referred to in paragraph (c) (i), (ii) or (iii), or
  - ii. not less than 0.5 ha and not more than 1 ha in size and is in a biogeoclimatic zone or subzone referred to in paragraph (c) (iv) or (v).

### *Upland Stream Areas*

#### Hydrological Recovery

In the Upland Stream section of the Plan, the term “hydrologically recovered” is used when referring to Upland Stream Areas. Hydrological recovery will be determined by applying a consistent methodology utilizing:

- a) Most current inventory – includes plan holder’s updates from field verifications and inventory investments;
- b) The total area of the subunit less Type I and II Fish Habitat area;
- c) Hydrological recovery curves appropriate for the area.

#### Inventory & Tracking Ledger

Prior to initiating developments within one of the designated watershed subunits, the Plan Holder will complete an analysis to determine the “baseline inventory” of Upland Stream Area and the proportion that is not hydrologically recovered. The analysis is meant to be a GIS exercise that produces a tabular summary of areas that are hydrologically recovered or not, with a spatial element to illustrate the results. These two outputs will form the basis for the Tracking Ledger.

To ensure all commitments are met, the Plan Holder will continue to maintain the Ledger to track the hydrological status of the watershed subunit.

### Watershed Assessments

Where the Plan Holder proposes to harvest such that <70% of a watershed subunit is hydrologically recovered, they have committed to ensuring that watershed assessment is completed by a qualified professional. Given that the Plan Holder is exceeding the “default” threshold of 70%, a more stringent assessment of the watershed subunit is required. Therefore, the “watershed assessment” is meant to be detailed in nature and will be completed by a qualified professional (e.g., like a Coastal Watershed Assessment Procedure).

### High-Humidity Microclimates

The Plan includes a result regarding stream channels in Upland Stream Areas that are incised, have steep gradients, and support riparian plant communities that are dependent on high-humidity microclimates.

Two key factors will be used to determine whether a stream qualifies: it must possess characteristics sufficient to produce the high-humidity microclimate, and the diagnostic high-humidity dependent plant community must be present. These two factors are interdependent, and the Plan Holder must consider both when identifying these unique Upland Stream channels.

As a general guideline for identifying these key pieces, the following is provided:

#### *Riparian Plant Community*

- On creek sidewalls and adjacent trees, plant communities will consist of ferns, herbs, and shrubs that are dependent on moist/ wet soils (e.g., maidenhair fern, lady fern, and salmonberry), as well as an abundance of bryophytes that are dependent on high moisture levels.

#### *Stream Channel Characteristics*

- Streams are typically 1–3m wide, with bedrock substrates and are generally steep (>20% slope) and broken/ irregular with step-pool structure.
- Channels are typically deeply incised (similar to a gully, sidewalls >3m, side-slope >50%) and rock controlled, with minimal soils, thus leaving minimal potential for erosion or debris flows.
- Channels typically contain waterfalls and a spray/ mist is produced or will be during high water flow, creating a cooler microclimate (noticeable on a warm day).
- Streams are usually shaded by trees or oriented such that shade is produced within the reach, regardless of canopy closure.

### *Sensitive Watersheds*

### Inventory & Tracking Ledger

Prior to initiating developments within one of the designated sensitive watersheds, the Plan Holder will complete an analysis to determine the “baseline inventory” for the watershed, including determining the current ECA. The analysis is meant to be a GIS exercise that produces a tabular breakdown of the ECA, with a spatial element to illustrate the results.

ECA will be calculated based on:

- Most current inventory – includes Plan Holder’s updates from field verifications and inventory investments;
- The total area of the sensitive watershed;
- Hydrological recovery curves appropriate for the area.

To ensure all commitments are met, the Plan Holder will maintain the Ledger to track the ECA for the watershed.

### Watershed Assessments

Where the Plan Holder proposes to harvest in a way that exceeds the prescribed ECAs for a sensitive watershed, they commit to ensuring that a watershed assessment is completed by a qualified professional. Given that the Plan Holder is exceeding the “default” ECA, a more stringent assessment is required. This watershed assessment will be detailed in nature and will be completed by a qualified professional (e.g., similar to a Coastal Watershed Assessment Procedure).

#### *Temperature-Sensitive Streams*

There are no temperature-sensitive streams designated in the Plan Area. Should a temperature-sensitive stream be designated, Plan Holder will follow the practice requirements under FPPR s. 53.

#### *Community Watersheds*

### Watershed Assessment & Tracking Ledger

Prior to initiating developments within one of the designated Community Watersheds, the Plan Holder will ensure that a watershed assessment is completed. This assessment will be detailed in nature and will be completed by a qualified professional (e.g., like a Coastal Watershed Assessment Procedure).

#### *Active Fluvial Units*

Refer to the *Glynnis Horel* Alluvial Fluvial Units for Haida Gwaii paper in the Appendix.

## **Biodiversity**

### *Ecological Representation*

#### Representation Analysis

The representation analysis proposed by the Plan Holder is a GIS-oriented exercise to determine the inventory of ecosystems, based on the best information available and updates to the information including but not limited to field verifications and TEM updates.

#### Tracking Ledger

To meet the LUO Objectives, the Plan Holder will maintain a Ledger to track the additions/removals to the baseline ecosystem inventory, including areas that have been designated for recruitment.

### *Adjacency*

The Plan Holder recognizes the importance of biodiversity on the landscape. They refer to the Biodiversity Guidebook developed in 1995 along with FRPA and FPPR requirements to determine adjacency and connectivity. Generally, the Plan Holder will adhere to a 400m leave strip between harvest areas unless the prescribing Forester provides a rationale to minimize the leave strip.

### *Northern Goshawk, Great Blue Heron, and Northern Saw-Whet Owl*

An objective of the Plan Holder is to identify and manage for the habitats of Northern Goshawks, Great Blue Herons, and Northern Saw-Whet Owls. The Plan Holder will adhere to the Ministry of Environment Guidelines for Raptor Conservation. Experience, education and further training of the Plan Holder' forestry development team in nest identification should result in potential nests being identified during the planning phase. If/when the forestry development team identifies a potential nest site, the Plan Holder shall have the potential nest and surrounding area assessed by a qualified registered professional working within their scope of practice to determine/confirm if the nest is present and belongs to a Northern Goshawk, Great Blue Heron, or Northern Saw-Whet Owl. The prescribing Forester will consider Northern Goshawk, Great Blue Heron, and Northern Saw-Whet Owl habitat creation when prescribing stand level retention strategies. Retaining snags and larger trees with old-growth characteristics will be prescribed and documented in the Site Plan when the prescribing Forester determines that the cutblock is suitable for such methods.

### *Marbled Murrelet Nesting Habitat*

#### Inventory

The "inventory" is meant to be a GIS exercise to clarify the Marbled Murrelet nesting habitat that has been identified, and what nesting habitat has been reserved. It is not meant to be a field analysis to identify or refine nesting habitat. The inventory analysis will be based on the best information available (i.e., the "Ecological Representation analysis conducted during Detailed Strategic Planning by the Joint Technical Working Group 2010").

#### Tracking Ledger

To meet the LUO Objectives, the Plan Holder will maintain a Ledger to track the additions/removals to the baseline Marbled Murrelet nesting habitat inventory.

### *Northern Goshawk Habitat*

#### Restricted Activities

As restricted activity zones can significantly impact forest operations, especially where nests are close to major roads, the Plan Holder will complete an assessment to determine if the nest is active. Where the assessment determines that the nest site is inactive, the restricted activity zone will not be required. The assessment completed by the qualified professional:

- a) will be completed within the Goshawk breeding season, and;
- b) will be re-assessed each breeding season, unless the Plan Holder elects to maintain the restricted activity zone, regardless of nest use, and;
- c) will consider the various Northern Goshawk nest uses, nest fidelity, and the best information available with regards to Northern Goshawk recovery strategies.

### ***Great Blue Heron Nesting Habitat***

As restricted activity zones can significantly impact forest operations, especially where nests are close to major roads, the Plan Holder will complete an assessment to determine if the nest is active. Where the assessment determines that the nest site is inactive, the restricted activity zone will not be required. The assessment will be completed by the qualified professional within the Great Blue Heron breeding season, and:

- a) will be re-assessed each breeding season, unless the Plan Holder elects to maintain the restricted activity zone, regardless of nest use, and;
- b) will consider the various Great Blue Heron nest uses and the best information available with regards to Great Blue Heron habitat management.

### ***Black Bear Dens***

An objective of the Plan Holder is to protect Black Bear dens used for over-winter hibernation. A qualified person, who is defined as a Forestry Professional, or someone working under the direct supervision of a Forestry Professional, who has completed wildlife and bear identification training or has equivalent experience, will complete a Black Bear den reconnaissance of each block during the planning stage. If a Black Bear den used for over-winter hibernation is located, the Plan Holder will adhere to the results and strategies of this plan. Where possible the Plan Holder will include management zones, areas adjacent to management zones, and Black Bear day dens in stand level retention. Stand level retention will be prescribed and documented in the Site Plan, and when the prescribing Forester determines the cutblock suitable for such methods, retention patches will be linked together. A windthrow assessment will determine the likelihood of wind damage and the prescribing Forester will use this information to prescribe the appropriate stand level retention strategy.

## **Annual Reporting and Data Submission**

Throughout the FSP, the Plan Holder committed to submitting documentation and digital spatial data to the Council of the Haida Nation and the Province of BC, on an annual basis. For clarity, a December 31 deadline was chosen, as this is typically an effective time both operationally and administratively. Generally, all development area information is submitted at the RP and CP stages, meeting the annual reporting and data submission objective. The December 31 deadline will still be utilized for any updates to the data or features outside development areas that did not get captured in the RP or CP submission process.

## **Windthrow Management & Management Prescriptions**

It is recognized that windthrow is a significant management issue within the Plan Area. Although objectives are not clearly established in legislation for windthrow management, the Plan Holder has included the following information to illustrate their intent and commitment to managing windthrow in relation to their development activities.

For all cutblock areas, the Plan Holder will complete windthrow assessments. The assessments will be completed to standards as outlined in windthrow assessment training on Haida Gwaii, and will include a consideration of both windthrow hazard and consequence criteria, resulting in an overall windthrow risk rating. Additionally, the windthrow assessment:

- a) will be signed off by a qualified professional, and;
- b) will be used to develop management prescriptions for appropriate areas, particularly

management zones or no-harvest zones, based on knowledge of prevailing winds and resource features in the area.

Examples of Windthrow Assessment Field Cards and Summary Forms (Taan Forest) are provided in the Appendix.

As noted above, management prescriptions with regards to windthrow will be based on information from the windthrow assessment. It should also be noted that windthrow assessment methods and associated management prescriptions may be informed by monitoring information and results that are available, including Forest and Range Evaluation Program (FREPEP) reports and information.

### **Tracking Ledgers - General**

The concept of maintaining a Ledger was developed during the implementation of the 2011 Haida Gwaii FSP to track the requirements associated with Cedar Stewardship Areas, Upland Streams, Sensitive Watersheds, Ecological Representation and, Marbled Murrelet nesting habitat,

The purpose of the Ledgers is to provide a clear picture of the baseline/ existing status of the element in question and allow the Plan Holder and Ministry of Forests staff to understand and track the progress of forest operations and planning. The Ledgers form part of the due diligence system, as well as being planning tools for meeting FSP obligations. The Plan Holder will continue to maintain them for their tenure areas.

## **4.0 Climate Change**

The Plan Holder recognizes the significance of climate change and how it may alter their management strategies in the future, and is taking steps to prepare and plan for the changing climate.

The Plan Holder is currently working with and assisting in funding the University of British Columbia's Yellow Cedar dieback research, and intends to continue to fund this research, with the objective of determining the best management strategies for Yellow Cedar on Haida Gwaii. In part, the objective of this research is to determine if climate change is resulting in Yellow Cedar dieback.

In addition to funding research efforts, the Plan Holder is committed to properly sizing bridges and culverts. A changing climate may influence precipitation, floods, and storm events that may affect how bridges or culverts have historically been sized. The Plan Holder will consider climate change when they are prescribing bridges and culverts and may prescribe larger structures able to withstand one-in-two-hundred-year floods rather than one-in-one-hundred-year floods.

The Plan Holder also considers climate change relating to stocking standards; however, there is little evidence now to indicate a need to adjust stocking standards for Haida Gwaii. If evidence from the current Yellow Cedar dieback research or other climate research indicates a need to change these standards, the Plan Holder will work with the Haida Nation on this stocking standard change. Changing standards may require seed source from off Haida Gwaii or the introduction of species not native to Haida Gwaii. The Haida Nation should be fully involved with these decisions.

## **5.0 Measures to Prevent Impact on Natural Range Barriers**

For the purposes of this FSP, forage refers to forage for Range purposes only. As of the submission date of this FSP, there are no Range activities in the FSP area. As there are no objectives for forage, there are no results or strategies that relate to forage.

Measures to prevent impact on natural Range barriers are not submitted in the FSP as there currently

are no agreements under FRPA within the Plan Area.

## 6.0 Stocking Standards

### Stocking Standards - General

The Stocking Standards proposed within the FSP are based on the Reference Guide for FDP Stocking Standards<sup>7</sup> (MOF, November 2010), as well as standards from the currently approved FSPs for the Plan Area, and the experience and local knowledge of Foresters who work in the Plan Area.

### Single-Entry Dispersed Retention System Standards

Stocking standards for “variable” basal area retention (e.g., contiguous openings with >5 to <40m<sup>2</sup>/ha) have also been included. Situations and circumstances have been included to describe where the Single-Entry Dispersed Retention System (SEDRS) stocking standards are to be applied. The intent is for the SEDRS stocking standard to be used to maintain the timber supply in areas that are otherwise constrained. Refer to Table 3, below, for a full listing of which stocking standards apply, depending on opening size or basal area retention.

As the Single Entry Dispersed Retention harvesting system approach is relatively new on Haida Gwaii, the application of the SEDRS stocking standards has been limited to a maximum of 10% of the AAC for the Plan Area. It is acknowledged that the SEDRS stocking standards will need to be reviewed in the next 5 years (i.e., at the end of the term of the FSP), including a review of any Timber Supply impacts.

It should be noted that the SEDRS stocking standards presented here are based on the work done by the Coast Region FRPA Implementation Team – Silviculture Working Group, as presented in the “Single Entry Dispersed Retention System Stocking Standard Discussion Paper” (November 2009)<sup>8</sup>. They are intended to be consistent with the direction provided in this discussion paper.

### Stocking Standards Application

It should be noted that prior to harvesting timber under the Single Entry Dispersed Retention System, the Plan Holder will need to clearly delineate the objectives for the harvest area, including specifying the stocking standards, acceptable leave tree characteristics, and basal area retention targets. Once harvesting is complete, the Plan Holder will need to do a post-harvest evaluation of the Standards Unit and assess the timber retained. Where “first pass” harvesting does not meet the requirements set out in the applicable stocking standard, additional harvest entries may be required (including subsequent re-evaluation).

**Table 3: Stocking Standards Application**

Contiguous Opening Size for Standard Unit (ha)	Standard Unit Basal Area Retention (m <sup>2</sup> /ha)	Applicable Stocking Standard
0.1–0.9	> 5 to < 40	SEDRS
0.1–0.9	≤ 5	Even-Aged
≥ 1.0	≥ 40	-
≥ 1.0	> 5 to < 40	SEDRS
≥ 1.0	≤ 5	Even-Aged

### Ecologically Acceptable Species

Ecologically suitable species are provided in the stocking standards in the Appendix. The suitability/



acceptability of regeneration will be determined in the field by a Qualified Professional based on site-specific soil moisture, nutrient, aspect, and elevation characteristics and tree performance in response to the site. Tree species that are ecologically suitable and commercially valuable are listed in the standards provided in the Appendix.

It should be noted that while the concept of preferred and acceptable species was commonly used in previous FSPs, recently tenure holders have moved away from this prescriptive approach and towards allowing the prescribing Forester to determine the appropriate species selections for a site (as detailed within the Site Plan), based on which species are ecologically suitable for the ecotype, as detailed within the FSP stocking standards. It should also be noted that the Establishment to Free Growing Guidebook: Vancouver Forest Region<sup>10</sup> (MOF V2.3, October 2007) states that both “Preferred” and “Acceptable” species, “are ecologically suited to the site” (pg. 6–7). The difference between “Preferred” and “Acceptable” has to do with management activities, not ecological suitability. For the stocking standards for this FSP, the ecologically suitable species for a given BEC unit are simply a combination of the “Preferred” and “Acceptable” species.

The Plan Holder does not intend to change the way they manage their silviculture obligations under the proposed stocking standards. Prompt reforestation efforts will be maintained, primarily through planting. Prescribing Foresters will focus on matching the most appropriate tree species to the reforestation sites, without compromising the economic value of future stands (i.e., match the best tree species to the given site; avoid conversion of cedar stands to hemlock).

Given that the Plan Holder must ensure that crop trees (at Free Growing) must be of good form and vigour, free from competition, and expected to remain so, it can reasonably be expected that they will manage reforested areas such that tree species are well suited/adapted to their sites.

### **Minimum Stocking Standard Cedar Content (MSSc)**

One of the changes in the proposed stocking standards, from previous FSPs, is the elimination of the Minimum Stocking Standard for cedar (MSSc). As discussed under the Cedar Retention strategy (LUO s. 7) above, while the MSSc will be eliminated, the concept of maintaining cedar in the regenerating stands has been carried forward and it is estimated that the amount of cedar planted will increase under the new FSP, compared with previously approved FSPs.

### **Free-Growing Heights**

Free-Growing heights have been established based on previously approved FSPs, as well as local knowledge and experience. While some Free-Growing heights may deviate from FDP stocking standard guides, at the time of Free-Growing the trees must still be of good form and vigour, ensuring that they are well adapted to their sites. Additionally, the trees that are accepted at Free-Growing must be reasonably expected to continue growing well and be part of the stand at rotation age (i.e., be above brush competition and no longer under deer browse pressure).

As Free-Growing declarations must be signed off by Registered Professional Foresters or Registered Forest Technologists, there is a professional reliance safeguard in place to ensure that crop trees are well suited to their growing sites and expected to remain so into the future.

#### **Sitka Spruce (Ss)**

Free-Growing heights for Sitka Spruce are reduced as indicated, given the reduction in brush competition (as a result of deer browse). While the height requirement is reduced, the performance expectations are still such that acceptable trees must be of good form and vigour and reasonably expected to continue growing well.

### **Red and Yellow Cedar (Cw and Yc)**

Free-Growing Heights for cedar are provided, consistent with the cedar regeneration objective, above. While cedar Free-Growing heights are reduced from FDP stocking standard guides, the performance expectations are still such that acceptable trees must be of good form and vigour and reasonably expected to continue growing well. Furthermore, the 1.2m minimum height will ensure that the cedar are above deer browse height.

### **Minimum Inter-Tree Distance Exceptions**

Exceptions to the standard 2.0m inter-tree distance have been included for situations where plantable spots may be limited in availability. By reducing the minimum inter-tree distance, the Plan Holder will be able to utilize the best available growing sites, ensuring effective reforestation.

### **Mixed Conifer – Hardwood Management**

Red Alder has been included as an ecologically suitable species for some BEC units. For these situations, the intent is for the Plan Holder to identify the hardwood management strategies and stocking standards within the Site Plan prior to harvesting. For the development area, separate stocking standards for conifers and Red Alder are to be assigned (based on a 0.25ha minimum stratum size). Where Red Alder is the leading species, the hardwood stocking standard will be applied; where it is not, it will not be accepted as a crop tree.

As mixed hardwood management is relatively new on Haida Gwaii, the application of the hardwood stocking standards has been limited to a maximum of 200ha per year, for all the Plan Holders combined. It is acknowledged that the hardwood stocking standards will need to be reviewed in the next 5 years (i.e., at the end of the term of the FSP), including a review of any Timber Supply impacts.

### **Free-Growing Survey System**

Development areas will be pre-stratified into appropriate polygons, assigned alder or conifer stocking standards, and surveyed as separate strata, consistent with standard survey procedures and the Site Plan.

All alder and conifer plots will be tallied separately, according to the respective stocking standards, to determine the overall achievement of stocking and reporting of inventory labels for each stratum within the development area.

The mixed-wood stocking standards have been prepared, based on the work done by the Coast Region FRPA Implementation Team – Silviculture Working Group, as presented in the paper, “Hardwood Management in the Coast Forest Region<sup>11</sup>” (July 2011). These stocking standards are intended to be consistent with the direction provided in the Hardwood Management paper.

## **FSP implementation**

The Plan Holder is committed to adhering to the intent of the Haida Gwaii Implementation agreement signed November 2017.

# Appendix

# Appendix A: Taan Watershed Tables

Table 4: 2016 Taan Area Available in Sensitive Watersheds Feb 15, 2017

Watershed Name	Sensitive Watershed	Taan Area	Area(ha) Harvested 2012	% Logged 2012	Area(ha) Harvested 2013	% Logged 2013	Area(ha) Harvested 2014	% Logged 2014	Area(ha) Harvested 2015	% Logged 2015	Area(ha) Harvested 2016	% Logged 2016	2012-2016 Tally %	2017 Area Available within 5 year 5% Cap	Under CP Area (ha)	Area Available After CP	Planned Blocks Area (ha)	Area Available After CP & Planned Blocks
Ain River	Yes	1,950.8		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	97.5		97.5		97.5
Awun River1	Yes	2,191.9	52.1	2.4%		0.0%		0.0%		0.0%		0.0%	2.4%	57.5		57.5		57.5
Awun River2	Yes	1,082.1		0.0%		0.0%	31.5	2.9%		0.0%	21.4	2.0%	4.9%	1.2		1.2		1.2
Awun River3	Yes	2,257.0		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	112.9		112.9		112.9
Baxter Creek	Yes	320.2		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	16.0		16.0		16.0
Beattie Anchorage Residual1	Yes	1,806.1		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	90.3		90.3	12.7	77.6
Blackwater Creek	Yes	3,425.5		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	171.3		171.3	12.4	158.8
Brent Creek	Yes	34.6		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	1.7		1.7		1.7
Canyon Creek	Yes	2,789.5		0.0%		0.0%		0.0%		0.0%	28.8	1.0%	1.0%	110.7		110.7		110.7
Chinukundl Creek	Yes	2,147.4		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	107.4		107.4		107.4
Deena Creek1	Yes	14.1		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	0.7		0.7		0.7
Deena Creek2	Yes	179.7		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	9.0		9.0	0.0	9.0
Deena Creek3	Yes	119.3		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	6.0		6.0		6.0
Demon Creek	Yes	1,478.0	19.8	1.3%		0.0%		0.0%		0.0%		0.0%	1.3%	54.1		54.1		54.1
Ghost Creek	Yes	3,296.3	21.1	0.6%		0.0%		0.0%	18.3	0.6%		0.0%	1.2%	125.4		125.4	50.6	74.8
Gold Creek	Yes	3,214.7	55.8	1.7%		0.0%	27.2	0.8%		0.0%	2.7	0.1%	2.7%	75.1		75.1	21.7	53.4
Haans Creek	Yes	2,688.6		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	134.4	44.6	89.8	63.4	26.4
Honna River1	Yes	1,649.3		0.0%		0.0%		0.0%		0.0%	0.4	0.0%	0.0%	82.1	23.6	58.5		58.5
Keats Creek	Yes	260.1		0.0%		0.0%		0.0%	0.1	0.0%		0.0%	0.0%	12.9		12.9		12.9
King Creek	Yes	2,286.7		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	114.3		114.3	40.3	74.0
Lower Yakoun River2	Yes	1,580.1		0.0%	1.2	0.1%		0.0%		0.0%		0.0%	0.1%	77.8		77.8		77.8
Lower Yakoun River3	Yes	1,585.4		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	79.3		79.3		79.3
Mamin River1	Yes	3,487.7		0.0%	47.3	1.4%		0.0%		0.0%		0.0%	1.4%	127.1		127.1	9.6	117.5
Mamin River2	Yes	2,156.3		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	107.8		107.8	34.1	73.7
Mamin River3	Yes	2,173.9		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	108.7		108.7	30.8	77.9
Mamin River4	Yes	1,302.6		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	65.1		65.1		65.1
Mamin River5	Yes	1,987.1		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	99.4		99.4	63.4	36.0
Martin Creek	Yes	1,885.0		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	94.3		94.3		94.3
Mathers Creek1	Yes	3,211.2		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	160.6		160.6	38.3	122.3
Mathers Creek2	Yes	1,270.7		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	63.5		63.5	7.9	55.6
Mathers Creek3	Yes	1,649.4		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	82.5		82.5		82.5
Mathers Creek4	Yes	1,873.2		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	93.7		93.7	36.9	56.7
Mosquito Lake1	Yes	1,181.9		0.0%	21.6	1.8%		0.0%		0.0%		0.0%	1.8%	37.5		37.5		37.5
Mosquito Lake2	Yes	1,422.3		0.0%	3.9	0.3%		0.0%		0.0%		0.0%	0.3%	67.2		67.2		67.2
Mosquito Lake4	Yes	152.2		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	7.6		7.6		7.6
Nina Creek	Yes	1,879.6		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	94.0		94.0	103.1	-9.2
Parsons Creek	Yes	352.8		0.0%	38.8	11.0%		0.0%		0.0%		0.0%	11.0%	-21.1		-21.1		-21.1
Phantom Creek	Yes	1,840.2	5.7	0.3%		0.0%	34.0	1.8%	17.9	1.0%		0.0%	3.1%	34.4	18.7	15.7	13.0	2.7
Queen Charlotte Skidegate Residual1	Yes	313.0		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	15.6		15.6		15.6
Queen Charlotte Skidegate Residual2	Yes	256.0		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	12.8		12.8		12.8
Queen Charlotte Skidegate Residual3	Yes	11.0		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	0.5		0.5		0.5
Shale Creek	Yes	1,558.7		0.0%	37.2	2.4%		0.0%		0.0%		0.0%	2.4%	40.7		40.7		40.7
Skedans Creek3	Yes	1,596.5		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	79.8		79.8		79.8
Skidegate Lake Residual1	Yes	1,482.6		0.0%		0.0%		0.0%	62.4	4.2%		0.0%	4.2%	11.8		11.8	18.7	-6.9
Skidegate Lake Residual2	Yes	2,493.2		0.0%		0.0%	114.5	4.6%		0.0%		0.0%	4.6%	10.2		10.2		10.2
Talking Bear Creek	Yes	1,675.7		0.0%		0.0%		0.0%		0.0%	21.6	1.3%	1.3%	62.2		62.2	36.1	26.1
Upper Yakoun River	Yes	1,826.1		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	91.3		91.3		91.3
Yakoun River1	Yes	2,127.0		0.0%		0.0%	0.2	0.0%	21.4	1.0%		0.0%	1.0%	84.7		84.7		84.7
Yakoun River2	Yes	2,936.0		0.0%		0.0%		0.0%	70.5	2.4%	37.9	1.3%	3.7%	38.4		38.4	12.0	26.4
Yakoun River3	Yes	1,098.2		0.0%		0.0%		0.0%		0.0%		0.0%	0.0%	54.9		54.9	35.6	19.3

## Appendix B: 2016 Taan Watershed Sub-basin Hydro Recovery Table Feb14, 2017

Table 5: Planned Block Shapes as of Jan 2017 (subject to change)

Status	BlockID	Area (ha)	Status	BlockID	Area (ha)
Planned	ALL001	11.9	Under CP	AER002	29.4
Planned	BEA001	4.4	Under CP	AER006	23.8
Planned	BEA001H	9.5	Under CP	GRA003	29.2
Planned	BEA002	3.6	Under CP	HAA001	42.6
Planned	BEA002H	13.2	Under CP	HAA005	4.6
Planned	BEA003	4.7	Under CP	HON001	23.6
Planned	BEA003H	18.8	Under CP	IAN004	24.7
Planned	BEA004	0.9	Under CP	IAN005	20.1
Planned	BEA005	3.6	Under CP	IAN006	41.7
Planned	BER005	34.7	Under CP	IAN032	24.1
Planned	DIN007	27.8	Under CP	PHT005	18.7
Planned	DIN009	24.6	Under CP	TOW006	21.5
Planned	FEA003	42.9	Under CP	WAS004	43.5
Planned	FEA004	36.0	Under CP	WAS007	12.6
Planned	FLO004	19.5			
Planned	GEI002	36.2			
Planned	GLD005	21.7			
Planned	GRA004	78.4			
Planned	GST005	7.5			
Planned	GST007	19.1			
Planned	GST008	16.7			
Planned	GST009	7.2			
Planned	HAA002	11.6			
Planned	HAA003	42.9			
Planned	HAA004	10.9			
Planned	IAN003	18.1			
Planned	IAN014	44.3			
Planned	IAN015	32.0			
Planned	IAN016	42.1			
Planned	IAN017	40.9			
Planned	KNG001	40.3			
Planned	LOG015	33.7			
Planned	MAM002	25.8			
Planned	MAM003	20.7			
Planned	MAM004	39.2			
Planned	MAM005	30.0			
Planned	MAM006	25.0			
Planned	MAT001	13.2			
Planned	MAT002	21.5			
Planned	MAT003	7.9			
Planned	MAT005	15.5			
Planned	MAT006	11.1			
Planned	MAT007	14.0			
Planned	NIN001	33.5			
Planned	NIN002	24.1			
Planned	NIN003	28.2			
Planned	NIN004	17.3			
Planned	PHT006	31.3			
Planned	ROC001	8.3			
Planned	SHN001	34.5			
Planned	SKE002	17.2			
Planned	SKIO12	18.7			
Planned	SUR002	38.2			
Planned	TAL001	36.1			
Planned	THR007	36.2			
Planned	THR008	29.1			
Planned	WAS001	12.2			
Planned	WAS002	23.9			
Planned	WAS003	34.0			
Planned	WAS006	12.0			
Planned	WAS008	39.4			
Planned	YAK005	12.0			

# Appendix C: *Active Fluvial Units updated 2016*

*Updated June 2016 for Haida Gwaii*

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*Glynnis Horel, P. Eng.*

*G.M. Horel Engineering Services Ltd.*

**Active fluvial units** include alluvial streams and their associated active floodplains, and active fans. They are of special significance because of the high ecological values often associated with them; and because the behaviour or character of these features might well be changed through harvesting. The critical deposits are those where erosion within the rooting depth is likely if the trees are removed; or in the case of active fans, where removal of trees can allow increased spread of sediment and debris deposition on the fan surface.

An initial identification of potential active fluvial units is typically done using office based information (e.g., air photos, topography, hill shade, and stream patterns); but requires field verification to delineate the extent of the active portion of the unit. Features of these types occur across the landscape at all scales, from high energy fans and large floodplains, to small low-energy features on S6 upland streams.

## **STREAM CHANNEL TYPES**

There are a number of stream classification systems in the scientific literature for denoting the physical attributes of channels and surrounding valley forms. For the purpose of forest management, and for identifying active fluvial units under the Haida Gwaii Land Use Objectives Order, coastal B.C. streams are categorized into three types based on characteristics relevant to forest management of coastal streams. The main distinction between the types is susceptibility to channel bank erosion and channel disturbance. This is consistent with the principles of the CIT Technical Report #3 (Church and Eaton 2004)<sup>1</sup>. For clarity, definitions for the stream types used in this document are provided in Table 6. “Alluvial” streams are those with alluvial channel bed and bank material, where one or both banks are in alluvial deposits – **these are active fluvial units**. “Semi-alluvial” streams are low-gradient streams (less than 8%) in confined channels with fluvially transported bed material and non-alluvial banks, or banks in glaciofluvial terraces that no longer inundate (e.g., were not formed by the contemporary stream). “Non-alluvial” streams are typically steeper gradient streams that are bedrock or boulder controlled but may have forced alluvial or semi-alluvial morphologies at choke points (“vertical jams”); or have log steps that store sediment. Low-gradient streams that have primarily bedrock or boulder-dominated channels are also non-alluvial streams.

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<sup>1</sup>Coast Information Team reports prepared for ecosystem-based management, 2004.

# ALLUVIAL STREAMS AND THEIR FLOODPLAINS

## **The importance of forests on floodplains**

Because stream floodplains are composed of materials deposited by the contemporary stream, these materials can be moved by the stream. Thus they are susceptible to erosion during peak stream flows. In large alluvial streams, riparian forests provide critical erosion resistance in the rooting zone along channel banks. They also provide large wood debris (LWD) which has many functions depending on the size of the alluvial stream; and is crucial for channel morphology and habitat features. During overbank flows in flood events, both LWD and the standing riparian forest provide roughness to the surface of the floodplain and slow the velocity of stream flow, thus reducing its erosive power.

The portion of the floodplain area that floods frequently (typically within 5 years) is the most vulnerable to forest removal and to other disturbances. If this zone is logged, severe effects (significant channel widening, aggradation, loss of channel structure) often occur within a few years with normal peak flows. Large alluvial streams may take many decades to recover from these effects.

## **Identifying the active floodplain**

The frequently flooded portion of a floodplain typically shows visible evidence of water flow or inundation (vegetative indicators, water-borne sediment or wood debris); and includes medium bench terraces adjacent to the stream and flood channels where this evidence is apparent.

In an extensive floodplain with multiple stepped benches or terraces, an extreme event such as a 100 year flood may inundate a much larger area than the frequently-flooded zone. During an extreme event, the stream may completely change its location within the floodplain.

The Haida Gwaii land use order defines an active floodplain to be “where water flows over land in a 1 in 100 year flood event, and includes low and medium benches...”

This provision conveys an intention to protect floodplains from these much rarer extreme events; and to ensure that, should such an event occur and the stream channel changes location within this larger floodplain, it would still be protected by riparian forest.

On these rarely inundated parts of the floodplain there may be little physical evidence to indicate the extent of the 100 year floodplain unless there has been an extreme event within the past few years. There may be no vegetative indicators or visible signs of water-borne sediment or wood debris. Determination of the 100 year floodplain in the field can be difficult unless there is a distinct topographic break. As well, medium benches are often not continuous or well defined; terraces may be discontinuous, or with varying stepped surface elevations.

Identification of the 100 year floodplain can be aided at locations where there is a designed bridge crossing on a floodplain. Bridge designs typically include flood frequency analysis and stage-discharge determination in order to set the design height of the bridge. The 100 year flood elevation is usually indicated on the design drawings; however, it is usually a relative elevation to a local benchmark established for the purpose of bridge design and construction. From this, one-metre lidar contours, if available, can be used to determine the absolute elevation and then extrapolate that to the limits of the

floodplain. However, one cannot extrapolate this flood elevation too far upstream or downstream of the bridge because the flood surface will be on a gradient similar to the stream gradient; and because the volume of water in the flood changes with distance along the stream channel. Note that not all bridges show a 100 year flood elevation; for example, if the bridge height is determined by the road grade well above a possible 100 year flood.

In the absence of design flood elevations, a best estimate of the 100 year floodplain can be made using the lidar hill shade image and 1 m contours, and then field checking to see if the floodplain delineated by this means appears reasonable.



**Table 6: Stream Channel Types**

Alluvial Channel	Alluvial channels are active fluvial units. They have at least one unconfined erodible bank in alluvial deposits. Alluvial deposits are material that was deposited by the stream under the contemporary flow regime. The stream has an identifiable floodplain (channel migration zone) and a riffle-pool or cascade-pool channel bed with a channel gradient up to 8% but typically $\leq 5\%$ . Alluvial streams on fans can be steeper. The stream can erode its bank(s) and widen its channel. Riparian vegetation is critical to limit bank erosion. If there is a significant channel migration zone, stream position may change within this zone, triggered by disturbance or a large flood event. Abandoned channels or flood channels may be present. LWD is important for channel structure and habitat features. Alluvial channels are often reaches of highly productive fish habitat and are highly sensitive to disturbance such as increase in sediment, logging of riparian forest, removal of LWD from the channel, or loss of LWD supply.
Semi-alluvial Channel	Semi-alluvial channels are not active fluvial units. The channel has confining banks in non-alluvial material (e.g., till, colluvium, rock). The channel position is stable; the stream cannot move laterally beyond its active channel. The stream has a riffle-pool or cascade-pool channel bed and gradients less than 8% but typically $\leq 5\%$ . LWD varies from important in small channels to absent or non-functional in large channels. Quality of habitat may be affected by aggradation or scour, removal of LWD, or loss of LWD supply.
Non-alluvial Channel	Non-alluvial channels are not active fluvial units. They are typically confined to entrenched channels with a stable position, although some non-alluvial channels flowing over rock or boulders may have limited lateral confinement. Banks are resistant to erosion (such as till, colluvium, rock). Non-alluvial channels are less sensitive to disturbance than semi-alluvial or alluvial channels. Banks in non-rock material may experience minor local widening or undercutting from erosion if vegetation is removed or in extreme storm events; and may experience bed or bank scour. Non-alluvial channels are typically transport zones. LWD function depends on stream energy and channel character. LWD is non-functional in high energy non-alluvial streams, but may function in small streams (especially those where gully processes occur) to trap sediment, limit scour, and control sediment transport. Channel bed is typically cascade-pool, step-pool or rock-dominated.
Wetland	Low-energy stream through wetland, typically fine-textured deposits or organic material in bed and banks.

# FANS

## Background

- This landform is a cone- or fan-shaped deposition area where a confined tributary enters a larger valley and becomes unconfined. The fan limits may extend to a half circle, or may be limited by topography or cutting by the main valley stream to a narrow arc.
- Fans can have surface slopes up to 20° (38%). Landforms steeper than this are considered cones.
- Alluvial processes dominate where the slope on the fan surface <4° (7%). Fans may be transitional – predominantly colluvial processes (debris flows) on the upper part of the fan, and alluvial processes on the lower fan. Between major colluvial events it is common for alluvial process to modify colluvial fans. For the purpose of defining “active fluvial units”, no distinction is made between these processes.
- Fan sediments are typically coarsest at the apex, becoming finer downstream, although boulders can be scattered across the full length of debris flow fans, and entrenched streams can transport coarse material farther down the fan.
- The natural stability of a fan is related to the relative ratio of sediment and water being delivered from a watershed. Many of the fans in BC were essentially formed during deglaciation, and contemporary fan-building or fan-eroding activity is frequently limited to only a portion of the fan surface.
- Active deposition processes that originate from sources in the drainage area above the fan may be from:
  - Natural landslides – either chronic or infrequent, or
  - Land use effects such as slides from roads or cutblocks.
- A watershed that is producing more sediment relative to water usually has a shallow, poorly confined channel, with evidence of water flows and sediment accumulation on the fan surface laterally beyond the stream channel.
- A watershed that is producing more water relative to sediment usually has a channel that is entrenched. However, an entrenched channel does not always indicate a naturally stable fan. Periodic debris flows can fill a 4 m deep, entrenched channel in one event, leading to broadcasting of water and sediment.
- Debris flow levees, either recent or historic, can be features that “entrench” a channel.
- Multiple channels may be present on fan. It is common for these channels to be established historically, with water flow in any channel being the result of localized sediment accumulations (frequently associated with debris jams) that partially or totally block off flow in other channel(s).

- Consequences of logging a fan can be:
  - Nil on stable fan with stable watershed upslope and appropriate engineering and harvesting prescriptions; or
  - Destabilisation of channels because of loss of root reinforcement along channel banks, increased sediment broadcasting, or stream diversion from wood debris, inadequate drainage structures, and inappropriate road construction; and/or
  - Difficulty of reforestation due to ongoing sediment deposition.

Destabilised fans can take decades to recover and restoration is rarely feasible.

### **Definition: Fans as active fluvial units**

Determination of fan characteristics and assessment of fan activity follow the hydrogeomorphic criteria from Land Management Handbook 57 (Wilford et al. 2005)<sup>2</sup> and Land Management Handbook 61 (Wilford et al. 2009)<sup>3</sup>.

Based on field evidence, individual fans can be stratified into two components: inactive and active units. The “active fluvial unit” is the active component of the fan (described below).

All or parts of fan surfaces with stands 200 years and older undisturbed by visible hydrogeomorphic processes, are considered stable within the timeframe of forest management and are not “active fluvial units”.

If no hydrogeomorphic processes are evident, the stream channel position is stable, and the fan is forested with stands 50 -200 years because of disturbances other than hydrogeomorphic processes such as fire, disease, or insects, then the fan is not an active fluvial unit.

If no hydrogeomorphic processes are evident, the stream channel position is stable, and the fan has been previously harvested more than 50 years ago with no evidence of post-harvesting disturbance, then the fan is not an active fluvial unit.

The active fluvial unit (rarely the whole fan surface) is defined as the “hydrogeomorphic riparian zone”. This is the zone where the forest stores sediment, maintains the stream location, and reinforces the soil mass.

### **Identification of hydrogeomorphic riparian zone**

Indicators of hydrogeomorphic processes are:

#### Airphoto evidence

- Visible sediment sources such as landslides in the watershed upstream of the fan indicate potentially high sediment loads are being delivered to the fan.

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<sup>2</sup> Wilford, D.J., M.E. Sakals, and J.L. Innes. 2005. Forest management on fans; hydrogeomorphic hazards and general prescriptions. B.C. Min. For., Res. Br., Victoria, B.C. Land Management Handbook No. 57.

<sup>3</sup>Wilford, D.M., M.E. Sakals, W.W. Grainger, T.H. Millard and T.R. Giles. 2009. Managing forested watersheds for hydrogeomorphic risks on fans. B.C. Min. For. Range, For. Sci. Prog., Victoria, B.C. Land Management Handbook 61.

- Variations in forest canopy on the fan surface linked to stream channels, such as deciduous bands or bands of younger stands than the surrounding forest (cohorts) indicate either multiple channels or land-clearing by debris flows or floods.
- Multiple channels which may appear as streams radiating out from the fan apex; may be inferred by the abrupt disappearance of the main channel from the airphoto view (smaller channels under the forest canopy); or may be visible as multiple points of discharge at the lower margin of the fan.
- Visible sediment accumulation in the channels or on the fan surface.
- Visible increase in gravel bars in the main stream immediately downstream of the confluence of the fan with a larger stream.
- Abrupt angles in the stream channel on the fan indicate a high potential for channel straightening.

#### Field evidence

- Unconfined stream channels with evidence of periodic flow on the fan surface outside the channels.
- Recent sediment distributed through the trees. “Recent” is defined as unvegetated or with limited accumulation of organic matter.
- Log steps storing sediment and debris.
- Visible channel diversions caused by jams of wood and sediment.
- Visible channel avulsions caused by sediment infilling or by erosion of the channel banks.
- Trees with partially buried boles (as evident from lack of butt flare).
- Scars on trees from impacts by transported sediment or wood.
- Levees of sediment and/or wood debris along the channel sides.
- Wood debris in jams, dikes along the channel sides, log walls piled against trees, or on the fan surface but recently water or debris flow transported.
- Root reinforcement along channel sides or across the fan surface which may appear as a network with minor erosion behind or below the roots.

*(For more detailed descriptions of the hydrogeomorphic riparian zone, refer to Land Management Handbooks 57 and 61).*

The limits of the hydrogeomorphic riparian zone are defined by delineating the zone from the apex

down where these processes occur. The top of the zone is the upstream point at which it is possible for the stream to be diverted from its present channel and re-occupy an older channel on the fan surface; or to flood the fan surface; or to establish a new channel in the event of a debris flow/debris flood/flood event. This point may be at the fan apex, or if the stream is well entrenched in the upper part of the fan (such as in a complex fan where the contemporary stream has downcut through an earlier fan formed during deglaciation), at the lower limit of entrenchment.

If no clear margins are evident (such as topographic changes) the limit of the active fluvial unit is at the transition to undisturbed forest stands 200 years or older.

## Roads on fans

The preferred location to cross a fan is at the apex. Crossing at the apex limits the length of road that can be affected by fan behaviour; however, if the channel above the fan is subject to debris flows or debris floods, the structure must still be able to accommodate this. The road location to the apex should be outside the limits of the fan and not cross up the fan surface.

Where this is not feasible, a road across the surface of an active fan must be able to accommodate debris deposition and channel switching. Because fans are permeable they may at times have significant subsurface flows that could be intercepted at road cuts and ditchlines. Ditchlines will also intercept broadcast surface flow occurring on the fan surface. If a road location crosses contours on a fan, the road ditch can encounter sufficient broadcast flow, seepage, or channelized flow to become a stream channel; or the road ditch can intercept a channel and divert the stream down the road. Channel avulsion above a road can wash out or bury a road. Active deposition can plug drainage structures or bury a road.

A road across the surface of an active fan should:

- Be located parallel to the contours to the extent possible, and avoid alignments up or down the fan surface. In particular, ensure drainage structures are either on flat grades or at dips in the road gradeline.
- Minimize cuts and fills to avoid intercepting seepage; and so that debris flows/debris floods reaching the road, or new stream channels cutting across the road, cause minimal impacts that are not significantly different than the natural behaviour of the fan.
- Have drainage structures preferably designed to be overrun if this is feasible. If this is not feasible, special designs may be needed for structures to accommodate debris flows or debris floods as well as anticipated stream floods. Armouring to train stream channels or construct ditchplugs must be durable rock coarser than the fan material, properly sized and founded to resist scour and entrainment. Avoid excavating sumps at the inlets of drainage structures in active channels as these will tend to aggravate bedload mobilization.
- Avoid excavating stream channels on fans if possible. If this can't be avoided, and it is necessary to do so to control stream flow to structures, the channels must be properly designed and constructed with suitable armouring to resist erosion, and other design features as appropriate such as sub-channel groins to limit bedload mobilization. Be aware that maintaining a channel to a structure could have consequences such as increased sediment deposition downstream on the fan surface. The downstream consequences should be carefully considered when reviewing options for drainage structures.
- Be deactivated when not in active use, with drainage structures removed or backed up with cross channels.

## **SMALL ACTIVE FLUVIAL UNITS ON LOW-ENERGY UPLAND STREAMS**

Small fans and floodplains can be found on small streams as well as large streams, including on S6 upland streams, especially where topography is highly variable. They occur at topographic widenings and gradient breaks along stream channels. There are many of these small AFU's across the landscape in Haida Gwaii. Because they lack the energy of large streams, riparian vegetation such as shrubs or young trees can be sufficient to maintain channel erosion resistance; and smaller trees can provide functioning large wood debris. Recovery of channel disturbance therefore takes place over much shorter time intervals than for large streams, often in just a few years when shrubs and young regen take hold. However, disturbance of these features (such as by yarding) can cause accelerated transport of sediment downstream until vegetation takes hold. Individually these are small sources but the cumulative effects of many such small sources can be significant with respect to sediment loading in channels downstream.

# Appendix D: Assessment Form - Windthrow Assessment Summary (Feb '13)

Operation: \_\_\_\_\_ Cutblock: \_\_\_\_\_ Date: \_\_\_\_\_

Assessment Completed by: \_\_\_\_\_

Review Completed by: \_\_\_\_\_

## Windthrow Treatment Prescription:

Boundary Segment	Risk Rating	Prescription
_____ to _____ _____ _____ to _____ _____ _____ to _____ _____	<b>Low</b>	<input type="checkbox"/> Maintain the boundary location and avoid windthrow prone edge protrusions. <input type="checkbox"/> Consider adjusting reserve or management zone widths/ locations (per LUO flexibility).
_____ to _____ _____ _____ to _____ _____ _____ to _____ _____	<b>Mod</b>	<input type="checkbox"/> <b>Old Growth</b> <input type="checkbox"/> Maintain boundary location and avoid windthrow prone edge protrusions. <input type="checkbox"/> Consider adjusting reserve or management zone widths/ locations (per LUO flexibility).  <input type="checkbox"/> <b>Second Growth</b> <i>If there is a feature to protect:</i> <input type="checkbox"/> Increase distance from the edge to the feature (use LUO flexibility and/ or consider adding additional management zone area) <input type="checkbox"/> Prune 50% of windthrow prone trees (30% removal of live crown, 10-20m into stand) <i>If no feature present:</i> <input type="checkbox"/> Maintain boundary location and avoid windthrow prone edge protrusions.
_____ to _____ _____ _____ to _____ _____ _____ to _____ _____	<b>High</b>	<input type="checkbox"/> <b>Old Growth</b> <i>Cedar Stand:</i> <input type="checkbox"/> Maintain boundary location and avoid windthrow prone edge protrusions. <input type="checkbox"/> Consider adjusting reserve or management zone widths/ locations (per LUO flexibility). <i>Non-Cedar Stand:</i> <input type="checkbox"/> Top 50% of the windthrow prone stems (remove 10% of the live crown, 20m into stand)  <input type="checkbox"/> <b>Second Growth</b> <i>Cedar Stand:</i> <input type="checkbox"/> Prune 75% of the windthrow prone stems (30% removal of live crown, 20m into stand). <i>Non-Cedar Stand:</i> <input type="checkbox"/> Prune 85% of the windthrow prone stems (30% removal of live crown, 20m into stand).



**Comments:**

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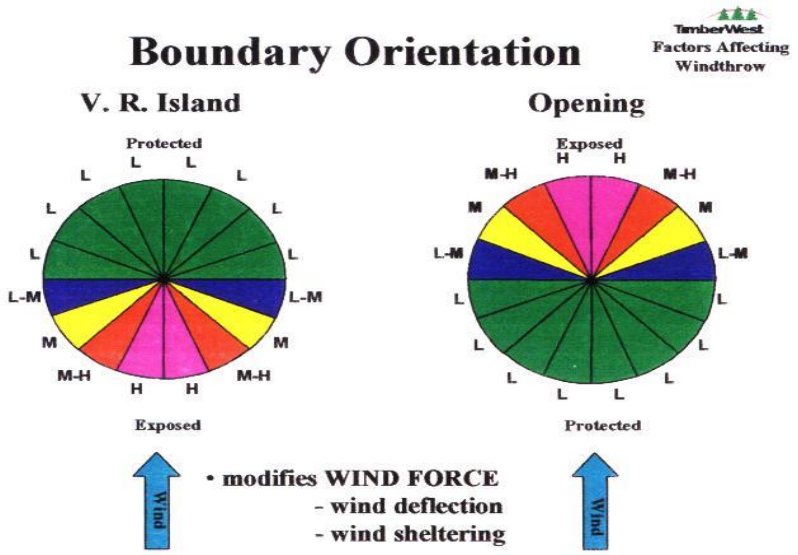
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**Instructions:** Group boundary segments according to the risk rank results from the field cards. Ensure a windthrow map is attached to show the risk rating (H red, M yellow, L green). Map must indicate direction of damaging winds.

Appendix E: Field Card - Windthrow Assessment (Nov '15)



### Windthrow Assessment Field Card

Cutblock or Road ID \_\_\_\_\_

Boundary Segment(s) \_\_\_\_\_

Name \_\_\_\_\_ Date Completed \_\_\_\_\_

Wind Direction: Primary (1°) \_\_\_\_\_ Secondary (2°) \_\_\_\_\_

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#### A. Wind Force Hazard

**Topographic Exposure**

<input type="checkbox"/> Crest	<input type="checkbox"/> Other Topography	<input type="checkbox"/> Shoulder
<input type="checkbox"/> Saddle	<input type="checkbox"/> Wind Intermediate	<input type="checkbox"/> Bowl
<input type="checkbox"/> Upper Slope	<input type="checkbox"/> Wind Sheltered	<input type="checkbox"/> Valley bottom perpendicular to prevailing winds
<input type="checkbox"/> Wind exposed		

**Stand Attributes**

<input type="checkbox"/> Low Density with ability for trees to hit the ground	<input type="checkbox"/> Uniform-Moderate Density	<input type="checkbox"/> Uniform-High Density but trees not anticipated to reach the ground
<input type="checkbox"/> Taller than Average		<input type="checkbox"/> Old growth
<input type="checkbox"/> Second growth		

High       Moderate       Low

#### C. Overriding Hazard - Existing Windthrow/ Adjacent Similar Edges

**Windthrow within the stand**

<input type="checkbox"/> Extensive (3 tree lengths)	<input type="checkbox"/> Minor (1 tree lengths)	<input type="checkbox"/> None
<input type="checkbox"/> Moderate (2 tree lengths)		

**Windthrow along adjacent/ identical/ previously harvested edges**

<input type="checkbox"/> Extensive (>70%)	<input type="checkbox"/> Moderate (10-70%)	<input type="checkbox"/> None (<10%)
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**Expected Damage**

<input type="checkbox"/> No more damage	<input type="checkbox"/> As expected	<input type="checkbox"/> No less damage
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High       Moderate       Low

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#### B. Overturning Hazard

**Tree Attributes**

<input type="checkbox"/> Low Taper	<input type="checkbox"/> Moderate Taper	<input type="checkbox"/> High Taper
<input type="checkbox"/> No Butt Flare	<input type="checkbox"/> Moderate Butt Flare	<input type="checkbox"/> Large Butt Flare
<input type="checkbox"/> Root or Stem Rot	<input type="checkbox"/> No Root or Stem Rot	

**Rooting Depth**

<input type="checkbox"/> Shallow (<0.4m)	<input type="checkbox"/> Moderately (0.4-0.8m)	<input type="checkbox"/> Deep (>0.8m)
--	--	---------------------------------------

**Soil Drainage**

<input type="checkbox"/> Poor	<input type="checkbox"/> Imperfect	<input type="checkbox"/> Good
	<input type="checkbox"/> Moderate	

High       Moderate       Low

#### D. Overall Windthrow Hazard

susceptibility of a stand to endemic windthrow (by gale force winds that have a recurrence interval of 5-10 years)

	<b>Wind Force Hazard (from Part A)</b>			
	<input type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High	
<b>Overturning Hazard (from Part B)</b>	<input type="checkbox"/> Low	<input type="checkbox"/> L	<input type="checkbox"/> L	<input type="checkbox"/> M
	<input type="checkbox"/> Moderate	<input type="checkbox"/> L	<input type="checkbox"/> M	<input type="checkbox"/> H
	<input type="checkbox"/> High	<input type="checkbox"/> M	<input type="checkbox"/> H	<input type="checkbox"/> H

---

#### E. Final Windthrow Risk

Note: If the Overriding Hazard Indicator from Part C (e.g., existing natural Windthrow or Windthrow in similar areas harvested in the vicinity of the cutblock) is greater than the hazard rating indicated by the Wind Force and Overturning Hazard sections (Part D), then the Overriding Hazard prevails.

Note: Determination of Consequence is a subjective approach. As a general guideline, moderate consequence can refer to damage to non-fish bearing streams or gullies while high consequence can refer to damage to fish bearing streams, water supplies, etc.

	<b>Overall Windthrow Hazard (Part D) OR Overriding Hazard (Part C)</b>			
	<input type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High	
<b>Consequence</b>	<input type="checkbox"/> Low	<input type="checkbox"/> L	<input type="checkbox"/> L	<input type="checkbox"/> M
	<input type="checkbox"/> Moderate	<input type="checkbox"/> L	<input type="checkbox"/> M	<input type="checkbox"/> H
	<input type="checkbox"/> High	<input type="checkbox"/> M	<input type="checkbox"/> H	<input type="checkbox"/> H

**Preliminary Treatment considerations:**

No treatment recommended

Boundary change recommended

Prune/ Top treatment recommended

November 2015

November 2015

## Appendix F: Field Card - Windthrow Prescription (Feb '12)

		General Windthrow Prescription Options		
		Over-riding Windthrow Risk		
		Low	Moderate	High
Stand Type	Old Growth	Maintain the boundary location and avoid windthrow prone edge protrusions. Consider adjusting reserve or management zone widths/ locations (per LUO flexibility).	Maintain boundary location and avoid windthrow prone edge protrusions. Consider adjusting reserve or management zone widths/ locations (per LUO flexibility).	<b>Cedar Stand</b> - Maintain boundary location and avoid windthrow prone edge protrusions. - Consider adjusting reserve or management zone widths/ locations (per LUO flexibility). <b>Non-Cedar Stand</b> - Top 50% of the windthrow prone stems (remove 10% of the live crown, 20m into stand).
	Second Growth		<b>If there is a feature to protect</b> - Increase distance from the edge to the feature (use LUO flexibility and/ or consider adding additional management zone area) - Prune 50% of windthrow prone trees (30% removal of live crown, 10-20m into stand) <b>If no feature present</b> - Maintain boundary location and avoid windthrow prone edge protrusions.	<b>Cedar Stand</b> - Prune 75% of the windthrow prone stems (30% removal of live crown, 20m into stand). <b>Non-Cedar Stand</b> - Prune 85% of the windthrow prone stems (30% removal of live crown, 20m into stand).

February 2012

### Additional Considerations

#### Windfirm Tree Characteristics

- Windfirm species (cedar)
- Low height to diameter ratio (i.e., short and fat)
- Dominant stand position (in multi-storey stands)
- Spike top cedar and trees with reduced live crowns

#### Windthrow Prone Tree Characteristics

- Windthrow prone species (Hw, Ba)
- Trees forked stems or damaged roots
- High live crown ratio
- High height to diameter ratio (i.e., tall and skinny)
- Co-dominant stand position (in multi-storey stands)
- Newly exposed, uniform edges

#### Retention Patches

- Patch sizes should be a minimum of 1.0ha in size (target between 1.0 to 3.0ha).

#### Pruning

- Consider the potential impacts to features or values if blow-down occurs beyond pruned edge (pruning in high risk situations can increase windthrow penetration further into the stand)

February 2012



# *Operations Supplemental Procedures: Monumentals*



*From the Land and Spirit of the Haida*

## Table of Contents

<b>Introduction.....</b>	<b>1</b>
Objective .....	1
Scope.....	1
<b>Harvesting.....</b>	<b>2</b>
Documentation.....	2
Pre-Falling .....	2
Falling .....	2
Post-Falling, Bucking & Limbing.....	3
<b>Transportation.....</b>	<b>3</b>
Yarding.....	3
Loading & Hauling.....	3
<b>Arrival to Sort.....</b>	<b>3</b>
Sorting.....	3
Scaling .....	4
<b>Tracking &amp; Purchasing .....</b>	<b>4</b>
Tracking .....	4
Purchasing .....	4
Release from HGCWAP .....	5



## **Introduction**

### **Objective**

The following *Operations Supplemental Procedures: Monumentals* is developed specifically for Taan Forest LP and its Contractors

The objective of these Procedures are to:

- Provide written guidance to employees and contractors for the harvesting, tracking and documentation of Monumentals from when they're standing in the forest until the time they leave the sort

### **Scope**

These procedures apply to all Taan operational activities including the following:

- Falling
- Transportation
- Sorting
- Scaling
- Haida Gwaii Cultural Wood Access Program (HGCWAP) Process

Health and Safety are the first priorities. Under no circumstances are these procedures to replace, or come before Taan Forest's Health and Safety Policy or Standard Operating Procedures. These Procedures apply to all Taan Forest personnel, including employees, consultants and contractors working within Taan Forest Tenures

## Harvesting



### Documentation

A *Monumental Tracking* form must be completed for each Monumental designated for harvest in a cutblock.

- The forms will be provided to the fallers, by a Taan Supervisor, during the pre-work meeting for the block
- Completed forms are to be forwarded to a Taan representative within 3 business days of falling
- Forms will be provided to the harvesting crew's Foreman, by a Taan representative, upon commencement of harvesting
- It is then the responsibility of the Foreman to ensure that each monumental is accounted for through the subsequent phases of yarding, hauling and arriving to the sort
- Completed forms are to be forwarded to a Taan representative within 3 business days of the Monumental being hauled to the sort

### Pre-Falling

When Falling Monumental Trees, fallers must follow the *Harvesting Instructions* as written on the back of the block map. A Taan Supervisor must be notified prior to falling the tree and a representative from Taan and the HGCWAP must be present on site. Alternatively, clear written directions specific to each tree may be given from Taan Supervisors on how to handle the tree (bucking, marking etc.), if the representatives are unavailable

- Confirm the Monumental Tree number in the field matches the Monumental Tree number to be harvested as indicated on the Plan/ Map
- Monumentals are indicated on the *Harvesting Instructions Map* with the following symbols:
  -  Monumental Cedar(> 120cm DBH)
  -  Monumental Cedar(< 120cm DBH)
- Specific instructions pertaining to the Monumentals that are to be harvested can be found on the back of the *Harvesting and/ or Road Instructions Map* under the 'Monumental Cedar & Cultural Heritage Features' section

### Falling

Safety is the first priority. If, for any reason, the Monumental cannot be felled safely inform the Taan Supervisor and/ or representative of the Haida Gwaii Cultural Wood Access Program (HGCWAP) immediately to come up with a plan

- Use extreme care when falling the Monumental to avoid damage, shatter or breakage.
- Where possible, do not fall other trees on top of the Monumental. If there is a potential problem notify the Taan Supervisor immediately

### ***Post-Falling, Bucking & Limbing***

- Limb the tree without damaging the stem. Buck according to the bucking lengths provided by the HGCWAP
- In **blue** paint, fallers must paint the top and side faces of the log with:
  - Block number
  - Monumental Tree number (MT#)
  - In addition to marking the log with paint, the block number and Monumental number should be notched into the butt of the log using a chainsaw (if safe to do so)

**Image 1: Example of proper labeling notched into the butt; Monumental # and Block # (M27 & PHT4).**



### ***Transportation***

Handling should be minimized during yarding, loading and hauling phases to reduce damage to the log

#### ***Yarding***

- Caution should be taken to avoid damage to the log (e.g. grapple marks, adequate deflection, etc.). Windrow logs to keep separated at roadside, where possible
- Handle with care not to gauge or break the stem
- Place in safe area at roadside for ease of loading
- Monumental trees will receive the Timber Mark associated with the block
- Ensure tree is still appropriately marked as specified above

#### ***Loading & Hauling***

- Monumental logs should be loaded one end at a time and placed on the bottom of the load to reduce damage during transportation
- Take measures to prevent binder straps from digging into stem
- On the way to the sort notify the Sort Supervisor via radio that the load contains a Monumental

### ***Arrival to Sort***

A Taan representative is to be notified as new Monumental cedar logs arrive at the sort

#### ***Sorting***

- The Dry-land Sort (DLS) crew must ensure that Monumental cedar are handled with care to avoid damage
- Monumentals are to be stored together at the DLS in their designated location:



**Skidegate Sort** – West end along the edge of the sort

When a truckload of Monumentals are at the sort, and upon direction given by a Taan representative the logs will be transported to the MFLNRO compound behind the Ministry office

**Ferguson Sort** – Compound in the southwest edge of the sort near the trailer reload area

**McClinton Sort** – Area near entrance to bunkhouse site in the northeast portion of the sort

**Dinan Sort** – Along treeline on the northwest side of the sort

**Louise Sort** – Southwest side of the sort

### **Scaling**

- All Monumental logs are to be scaled & tagged
- The scaling tag must be securely fastened to the log so it remains in place
- Ensure that all identifying markings (block number, Monumental number & tag number) are still visible and legible; re-mark if necessary

## **Tracking & Purchasing**

### **Tracking**

It is important to ensure that these procedures are followed for efficient tracking and complete documentation of Monumentals from the time they are standing until they leave the sort. It is crucial that proper marking is maintained throughout this entire process

- Upon notification of the arrival of a Monumental to the sort, a Taan representative will collect and record information to maintain an inventory on the Monumentals
- Information Collected:
  - Block number
  - Monumental Tree (MT) number
  - Species
  - Scaling Tag number
- The scaling tag number is then used to look up scaling specifications from NetScale
- All of the information collected is entered into a spreadsheet that is submitted periodically to the Haida Gwaii Cultural Wood Access Program (HGCWAP)
- This spreadsheet can be found on the Taan Server under:  
*Y:\Corporate\22-Cultural Wood Program\01-Inventory*

### **Purchasing**

After a purchaser has been approved for a Monumental through the application process with the HGCWAP, they need to arrange for payment and pick-up of that log:

- The HGCWAP coordinator notifies the Taan representative of an approved applicant and the Monumental they're interested in purchasing

- Upon requesting an invoice to be made, provide the log inventory accountant with the following information:
  - Legal name of purchaser (personal or business)
  - Current address
  - Monumental tag number
- An invoice is created by the log inventory accountant based on a pre-determined per cubic meter rate and the volume of wood as determined during the scaling of that log
- Invoices will be provided to the purchaser by the log inventory accountant
- Payments can be made either by mail or in person at the Taan Forest office in Skidegate
  - Only cheque or money order are accepted; **cash or credit card cannot be processed**
- Once payment is received, a receipt will be provided. That receipt is required for the release of the log from the DLS
- Pick-up can be arranged with a Taan Harvesting Supervisor
- Load slips for the transportation of Monumentals must be Ministry (MFLNRO) approved (generally books provided by MFLNRO or truck drivers carry them) and are legally required documentation that must remain with the log during transportation
  - Load slips must be appropriately filled out by Sort and/or Taan Supervisors

### ***Release from HGCWAP***

- Monumentals will be available to the HGCWAP process for 6 months from the date the trees arrive at the sort
- If Monumentals are not allocated for use during that timeframe or if at any time, the coordinator of the HGCWAP determines they are not suitable for use, they will be re-scaled and released to be put back into production by the licensee



# Appendix H: VQOs

Figure 2: VQO\_Overview\_Graham\_North\_compact

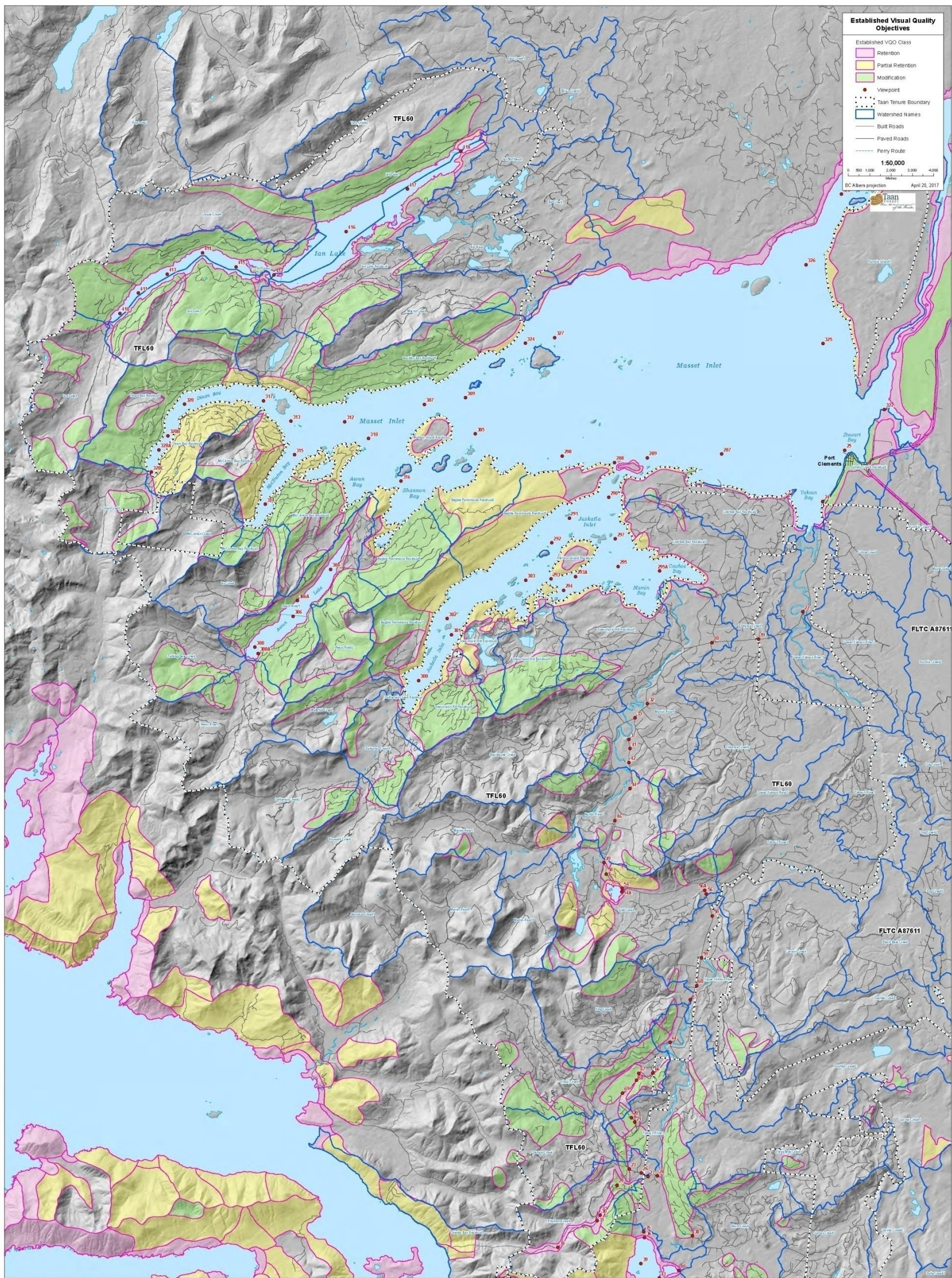


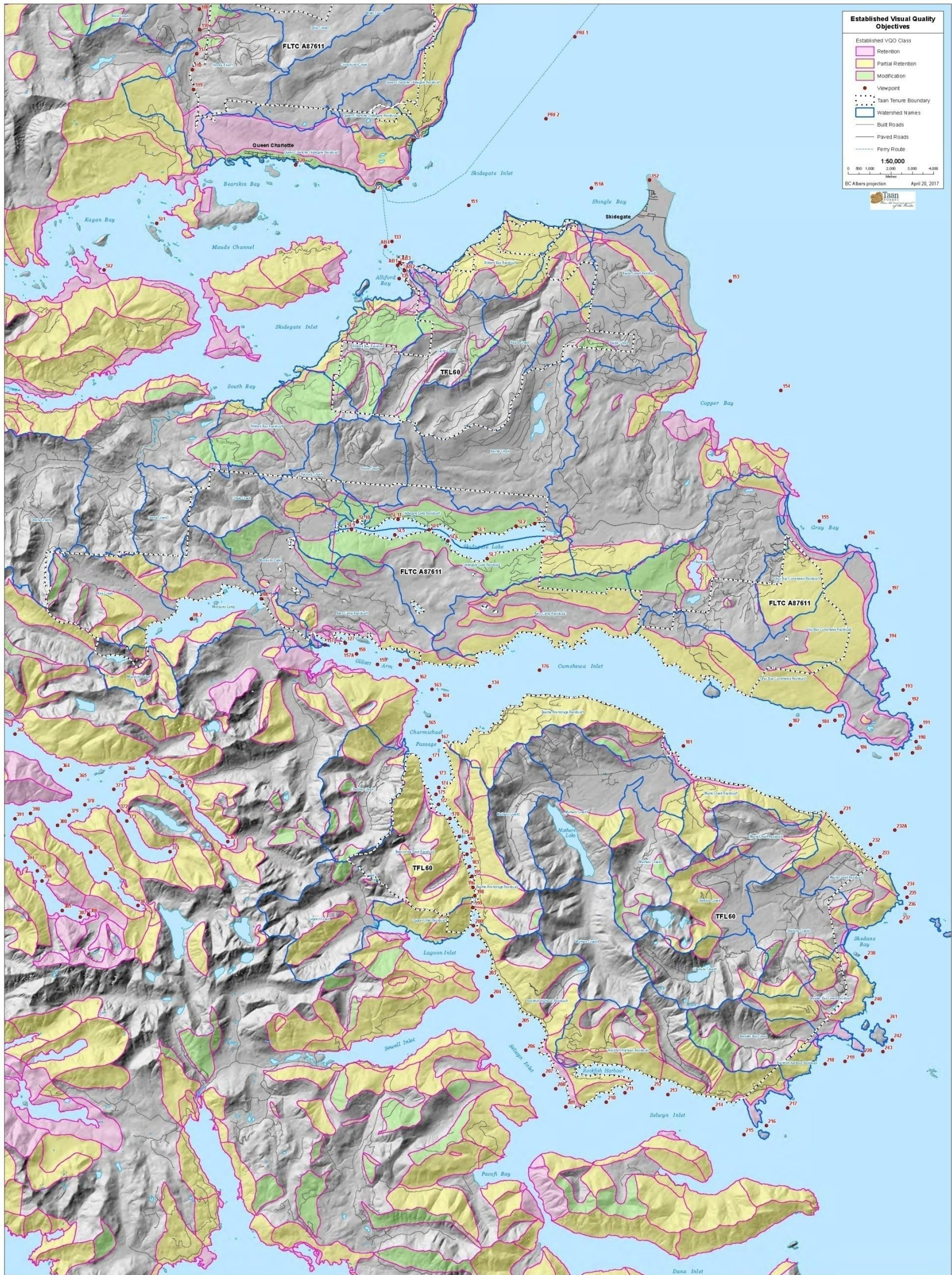


Figure 3: VQO\_Overview\_Graham\_South\_compact





Figure 4: VQO\_Overview\_Moresby-Louise\_compact





# Appendix I: Windthrow Monitoring Form (Sept '16)

Windthrow Monitoring Form												
<b>Cutblock ID:</b> _____	<b>LU:</b> _____	<b>Harvest Year:</b> _____										
<b>Completed By:</b> _____	<b>Date:</b> _____											
<b>Instructions:</b>												
Windthrow Monitoring will be completed during block assessments at the following stages (indicate the applicable stage):												
<ul style="list-style-type: none"> <li>• <input type="checkbox"/> Post-Harvest Assessment</li> <li>• <input type="checkbox"/> Survival Walkthrough Assessment</li> <li>• <input type="checkbox"/> Stocking Survey</li> </ul>												
Boundary sections should be reviewed consistent with those initially identified within the Pre-Harvest Windthrow Assessment. A colour copy of the windthrow assessment map should be available while in the field completing this form. Where windthrow is noted above a 20% threshold in a particular boundary section or specific point in the boundary section further detail must be recorded below.												
Observed Windthrow												
<b>Estimated Windthrow</b>	<b>Boundary Section</b> (from Pre-Harvest Windthrow Assessment) using Falling Corners.											
<10%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11-20%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21-50%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51-70%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>70%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For boundary sections or specific areas with >20 % windthrow:												
<b>Items Reviewed:</b>	<b>Boundary Sections w/ &gt;20% Windthrow</b> using Falling Corners.											
Boundary Edge or Internal Patch												
Distance to windward edge (fetch) - m												
W.T. Penetration (into stand) - m												
Orientation of W.T. - degrees												
LUO Feature Impacted	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="checkbox"/> Y <input type="checkbox"/> N
Topographic Location (Crest, Saddle, Mid, Lower)												
Tree Ht – m (dominant/ co-dom)												
Soil Drainage (L, M, WD)												
Rooting Depth (Shallow <0.4m; Mod 0.4-0.8m; Deep <0.8m)												
Stand Structure (Even/Uneven and Dense/ Open)												
<b>Salvage Opportunity:</b> <input type="checkbox"/> Y <input type="checkbox"/> N												
<b>Attachments:</b> <input type="checkbox"/> Map <input type="checkbox"/> Photos <input type="checkbox"/> Additional Forms (i.e., more boundary sections)												

**Comments:** attach additional pages if needed.



Corporate Management System – CMS

# Planning SOP



*From the Land and Spirit of the Haida*



## Table of Contents

<b>Purpose.....</b>	<b>2</b>
<b>Scope .....</b>	<b>2</b>
<b>General Procedures.....</b>	<b>3</b>
Written Approvals, Plans and Contracts .....	3
Emergencies, Problems or Issues .....	3
Invasive Plants.....	3
<b>Salvage Development Procedures.....</b>	<b>4</b>
Post-Harvest Areas.....	4
Damaged Timber Area.....	4
<b>Block Development Procedures.....</b>	<b>6</b>
Selection of Area.....	6
Chance Plan – Recce Area.....	7
Recce Review .....	7
Cultural Feature Identification Survey.....	7
Block & Road Naming Conventions.....	8
Block Layout.....	8
Layout Considerations .....	10
Post Layout .....	35
<b>Data Submissions.....</b>	<b>36</b>
<b>Cutting Authority Permits .....</b>	<b>36</b>
<b>Road Inspection Procedures .....</b>	<b>36</b>
Timing.....	36
Conducting the Inspection.....	37
<b>Forestry Planning Procedures.....</b>	<b>38</b>
Site Plans.....	38
Windthrow Monitoring Assessments.....	39
Post -Harvest Assessments.....	39
Soil Rehabilitation Planning Procedures.....	39
Creek Cleaning Planning Procedures.....	39
Site Preparation Planning Procedures.....	40
Fuel Hazard Assessments and Abatement Procedures.....	40
<b>Field Marking Standards .....</b>	<b>41</b>
<b>GPS Survey Standards .....</b>	<b>43</b>
<b>Mapping Standards .....</b>	<b>44</b>
Recce Map.....	44
Field Maps.....	45
Cruise Plan Map.....	45
Cultural Features Identification (CFI) Survey Map.....	45
Information Map .....	45
Appraisal Map (Exhibit 'A').....	46
Road Permit Map .....	46
Site Plan Map (Cutblock & Road) .....	46
Road Instruction Map.....	47
Road Reactivation Map.....	47
Harvest Instruction Map.....	47
<b>Filing Standards.....</b>	<b>48</b>
File Naming Conventions.....	48

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## Purpose

Standard Operating Procedures (SOPs) are an integral component of our Corporate Management System (CMS) and provide key controls to ensure that our activities are carried out in compliance with legislative requirements and meet our commitments to ensuring the health and safety of employees and contractors while engaging in sustainable forest management practices.

SOPs are designed to complement Job Safety Breakdowns, quality and technical training, other SOPs and site specific plans or instructions.

## Scope

This SOP provides direction regarding planning and forestry forest management activities carried out by Taan employees and contractors, including the following:

- Planning & Engineering (including salvage planning)
- Forestry & Silviculture

Where conducting services on behalf of a client (e.g., BCTS) that have their own Management System and procedures, the client system is to be used.

SOPs require that each employee perform their duties to the best of their abilities. All personnel and contractors are encouraged to take responsibility to clarify plans or activities if they are uncertain about how to achieve the desired results.

Health and Safety is the first priority. Under no circumstances are SOPs to replace, or come before, safe work practices.

Note: As planning requirements vary, these procedures do not specify the process for planning and forestry, rather they are designed to ensure that on-the-ground field layout is conducted in a way that minimizes impacts to the environment and ensures professional due diligence.

This SOP is intended to be a "living" document and will be updated from time to time to address changes to legal requirements as well as changes to corporate commitments (e.g., certification).

The Planning Checklist is an important component of the Planning SOP, as it provides for documentation of the pre-planning considerations and the layout considerations that are considered for each proposed development area.

## General Procedures

### Written Approvals, Plans and Contracts

- A pre-work meeting must be completed prior to starting a Planning & Engineering or Forestry & Silviculture project (initial recce stages are exempt). A project may be a group of blocks within a drainage, a contract, or a specific program such as planting. A Taan Planning Representative must review plans and setting files (including maps, correspondence, checklists, etc.) with the Planning Contractor Representative before forestry and engineering activities begin. Where necessary, a field visit may be required.
- A Taan Planning Representative must ensure up-to-date documents (e.g., SOPs, maps and plans) are provided to the Planning Contractor Representative. These documents must be made available to layout crews and filed correctly within the Taan file system.
- Familiarize yourself with the plan or contract specifications prior to the commencement of work activities. Conduct activities according to the plan or contract.
- Minor modifications are permitted to address unforeseen circumstances. Do so only when activities will not significantly impact the environment or the quality of the final product.
- If personnel are uncertain about how to perform a task to achieve the desired results, immediate clarification from the supervisor must be received before continuing work. Work elsewhere until further instructions are received.
- All personnel are responsible to ask questions when issues or problems arise.
- The Taan Planning Representative and field staff must confirm a system for crew check-ins. The system must meet the minimum Taan Common SOP requirements for crew check in. Gather a list of emergency contacts specific to the work area or project and file the information within the Taan Check in Procedure Binder, or equivalent.
  - If Planning Contractors are following their own procedures, provide a copy to the Taan Planning Representative.

### Emergencies, Problems or Issues

- If an emergency occurs (like a fuel spill, fire, landslide or injury) personnel must take appropriate measures to ensure their personal safety, follow your site specific emergency response plan and the EPRP SOP.
- Emergency contacts are located in Appendix 1 of the EPRP.

### Invasive Plants

- Be aware of known locations of invasive plants (GIS layers) in your work area (refer to the Invasive Plants [IAPP Map Display](#) and the Invasive Plants Matrix for known plants on Haida Gwaii filed on the Taan server under Planning/08-Inventories/Invasive Plants).
- Ensure that any new sightings are reported to your Taan Supervisor. Ensure that all Plans contain prescriptions that consider invasive plants (where applicable) such as reporting, machine washing and sanitization, etc.

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## Salvage Development Procedures

### Post-Harvest Areas

- Salvage areas within the Salvage Contractor's operation Unit identified as "Post-Harvest Areas" must initially be submitted to the Taan Salvage Coordinator for approval. Areas should be identified at a minimum as a block shape using Google Earth or similar ortho photo with a line shape identifying the area at a 1 to 5,000 scale. Indicate on the map:
  - Estimate of area
  - Estimate of volume
  - Estimate of species breakdown
  - Reference points, either Lat's and Long's, UTM or at the least a neighbouring landmark
- The proposed area will be reviewed by the Taan Salvage Coordinator for conflicts with:
  - Land Use Order Higher Level Objectives
  - Taan harvesting or harvest planning – confirmed with Taan Planning Coordinator
  - Additional conflicts previously identified through Taan planning processes
- Provided the proposed area is not in any conflict with higher level planning or with harvest operations the Taan Salvage Coordinator will ensure the contractor:
  - Creates 1:5,000 scale or 1:10,000 scale maps "PH Salvage Instructions" depending on the size of the area of approved Post Harvest Areas identifying:
    - salvage boundaries
    - streams, wetlands, lakes and other water courses
    - required buffers, no cutting zones and machine free areas
    - resource features such as WTRA's, Haida Land Values, Arch Features, bear dens, raptor nests, etc
    - known block hazards
    - Instructions relating to timber marking/ approved timber marks, access/ trail rehabilitation (where applicable), protection of existing regeneration, silviculture/ reforestation (where applicable) and cutting permit requirements/ specifications
  - File the applicable block information (shape files, maps, etc.) per the Planning & Engineering and Filing procedures (below).
- The Taan Salvage Coordinator will apply to the MOF for the area to fall under the appropriate Post Harvest Salvage Cutting Permit.
- Taan Salvage Coordinator must complete a Pre-work meeting with the Salvage Contractor (ensure the Pre-work meeting checklist is filed).

### Damaged Timber Area

- Salvage areas within the Salvage Contractor's operation Unit identified as "Windfall Salvage Areas" must initially be submitted to the Taan Salvage Coordinator for approval. Areas should be identified at a minimum as a block shape using Google Earth or similar ortho photo with a line shape identifying the area at a 1 to 5,000 scale. Indicate on the map:
  - Estimate of area
  - Estimate of volume
  - Estimate of species breakdown
  - Reference points, either Lat's and Long's, UTM or at the least a neighbouring landmark
- The Identified area will be checked by the Taan Salvage Coordinator for conflicts with:
  - Land Use Order Higher Level Objectives
  - Taan harvest planning – confirmed with Taan Planning Coordinator
  - Additional conflicts previously identified through Taan planning processes

- Provided the proposed area is not in any conflict with higher level planning, the Taan Planning Department (which may include planning and forestry contractors that work under the direct supervision of Taan) will conduct required layout, assessments and generate required plans/ maps.
- Block development of Damaged Timber will follow the Taan Block Development Procedures (below).
- Taan Planning Department will complete a Pre-Work and Pre-layout Checklist. There are three types of layout to be identified:
  1. Contiguous areas of salvage <1.0ha
  2. Contiguous areas of salvage >1.0 ha and <3.0ha
  3. Contiguous areas of salvage >3.0ha

**Contiguous Area <1.0ha**

- Block layout is completed as per the Taan Block Development Procedures “Final Layout” (below).
- Taan ensure that all required permits and authorizations are completed (e.g., road permit road use agreements, scale site authorizations).
- Taan completes necessary SP Amendments and/ or Salvage Plan (to ensure that amendments are completed to the existing Site Plans/ Silviculture Prescriptions if they exist – adjusting WTRA’s etc. and to ensure that the proposed salvage harvesting is also covered off by a Site Plan/ Silviculture Prescription or Salvage Plan document). A Salvage Plan is completed using the Site Plan/ Salvage Plan template, completing all sections of the document except for the reforestation/ stocking standards ID section.
- Taan prepares Harvest Instructions outlining general logistics of the operations and a Silviculture Regime (consistent with the Haida Gwaii FSP Retention Stocking Standards).
- Taan reviews and submits the application(s) to the MFLNRO.
- Taan contacts the Salvage Contractor to arrange a pre-work and release the work area.
- Salvage Contractor informs Taan Salvage Coordinator and the MFLNRO office of start-up, timber transportation prior to hauling, and completion of salvage operations.
- Salvage Contractor completes scale of timber and submits to Taan.

**Contiguous Area >1.0ha to <3.0ha**

- All of the procedures related to Contiguous Area <1.0ha (noted above) apply to areas between 1.0ha and 3.0ha.
- In addition, at the same time the Harvest Plan is developed (step 5 above), Taan completes a signed and sealed Site Plan created by a Registered Professional Forester including all necessary assessments (per the Planning SOP requirements for Block Development and Site Plans).

**Contiguous Area >3.0ha**

- These opportunities are discouraged due to complexity and cost risk to the Salvage Contractor. Areas more than 3.0ha, are moved from the Salvage Planning program to the Operational planning program and are considered Block Development (procedures below).
- Areas may be competitively bid to include other salvage operators and small scale operators.
- Taan planning contractors complete the block layout as per the Taan Block Development Procedures (below).

## Block Development Procedures

- Prior to conducting field work, a Planning Contractor Representatives should consider reviewing the following documents or items:
  - Contract specifications
  - Management System Documents – CMS or EMS (i.e., Taan and/ or BCTS)
  - Operational Plans (i.e., Forest Stewardship Plan (FSP))
  - FSC Management Plans (where applicable)
  - First Nations Agreements or Heritage Concerns
  - Public comments
  - Terrain Stability Classification Mapping, if applicable
  - Recreation and Visual Objectives, if applicable
  - Biodiversity and Wildlife Issues, if applicable
  - Adjacent property boundaries and tenure holders
- All RoadEng Field Notes must be entered digitally. The file name, entry date and person entering the notes must be written on the front of the field notes. Once field notes have been entered, file the field cards in the appropriate file folder (electronic scanned preferred). Record the date and initials of the person who entered the field notes on the field cards.
- All block information will be collected using Taan's templates, where applicable.
- Block information will be uploaded and filed accordingly on the Taan file server. All files should be uploaded after data collection and checked for accurateness.
- Never delete files from the Taan Server, use an Archive folder (the only exception is if a file is incorrectly uploaded).
- All folders and files must be adequately named per the File Naming Convention Procedures (see below).
- There are several different stages of block development:
  - 1) Selection of Area
  - 2) Chance Plan (Recce)
  - 3) Recce Review
  - 4) Final Layout
  - 5) Cultural Feature Identification Survey
  - 6) Cruise
  - 7) Assessments
  - 8) Site Plan
  - 9) Post Layout

### **Selection of Area**

- Areas will be selected by either: Taan Course Filter Planning and the Contractor will receive a digital or hard copy map of the area; or the Contractor will discover potential harvest areas based on local knowledge and confirming with Taan that there are no conflicts with higher level planning.

### **Chance Plan – Recce Area**

- Contractors will field visit the proposed areas to: estimate block location and size, road location, construction type and length, stand composition, species %, volume and sort types.
- Multiphase contractors will provide Taan with shape file and GPS traverse data of recce'd block shape & roads. The shape file can be created by GPS traverse or by digital hand drawn estimate with geo reference.
- Recce maps should show general boundary and road location and estimates of streams and types/ classification.
- Following field work, enter the block information into the Contractor Pro-forma Sheet ([Taan Server://Shared/Public engineering/Contractor/Pro-Forma Template](#))
- Chance Plan/ Recce data is filed under [Taan Server://Shared/Public Engineering/Block File](#) and named per the Taan File Naming Convention procedures. Use a sub-folder to separate data (GPS and shape files) from maps (file map directly under Geomatics folder).
- Create the cutblock and required sub-folders on TaanFile using the cutblock template provided.

### **Recce Review**

- Taan will review recce information for conflicts with LUO and Taan objectives, mapping conflicts (WTRAs, other proposed areas, etc.) and general location.
- Planning review considerations include, but are not limited to, the following (refer to the FSP for more detail):
  - For non-spatial landscape level reserves (e.g., ecological representation, Marbled Murrelet), current status of target representation is reviewed by Taan Planning at the Chance Plan/ recce stage prior to approval of final layout.
  - Ensure each watershed equivalent clearcut area is maintained at <25%, unless a hydrological assessment has been completed by a qualified professional and has been made publically available. Where assessments indicate decreasing channel stability, road construction and harvesting activities will not proceed in relevant portions of watersheds, unless it can be demonstrated that further development will not slow channel recovery or contribute further to channel instability.
  - Sensitive Watershed equivalent clearcut area considerations.
  - Any proposed operations within Cedar Stewardship areas and required thresholds.
  - Cedar retention requirements and required calculations.
- Taan will review the pro-forma, adjusting costs and values accordingly to current market conditions and harvest bids.

### **Cultural Feature Identification Survey**

- Complete a CFI Survey conducted in accordance with the procedures under assessments section of the SOP.

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## **Block & Road Naming Conventions**

### **Block Names**

- First Three Capital Letters of the watershed name followed by three numbers, sequentially ordered. Final block names to be confirmed by Planning to ensure there are no naming conflicts. For example:
  - Awun watershed = AWN
  - First block in the watershed = 001
  - Block name = AWN001
- Recce blocks – same rule except followed by \_R and two numbers – Example AWN\_R01

### **Road Names**

#### Road Permit Roads

- 5 orders of roads
  - 1 – Main Lines >10km – Full spelling. e.g., Blackwater Main
  - All roads off the main use 4 letters
  - 2- <10k >5k Named based off km leaving Main. First long road off of Blackwater Main at 2 km is Named in 1000s e.g. Blac2000
  - 3 - <5km >1km. Name based off km leaving previous road in 100s e.g., road leaving at 800m = Blac2800
  - 4 - <1km >500m. If possible name based on km leaving previous Rd but likely named sequentially in 10's eg. Blac2810
  - 5 - <500m – Sequentially numbered in 1s e.g., Blac2813

#### Cutting Permit Roads

- CP roads are block specific and generally short.
- CP road naming convention, use the block name and then sequentially number spurs. For example the first spur in BLA001 =
  - BLA001-1
  - 2<sup>nd</sup> spur BLA001-2
  - 3<sup>rd</sup> spur BLA001-3 (secondary spurs off this spur would be BLA001-3A, etc.

### **Block Layout**

- Following review of recce, pro-forma and CFI Survey, Taan will communicate to the contractor the next steps as to whether layout may continue, whether any plans need to be adjusted or whether layout should cease.
- Prior to the start of a new project, Taan will complete a Pre-Work Meeting and Pre-Layout Checklist with the Contractor Representative. The Contractor will initiate the completion of the forms found on: [Taan Server://Shared/Public/Forms&Checklists](#).
- One Pre-Work may cover several blocks/ areas. However, the Pre-Layout checklist must be completed for each block.
- Pre-Work and Pre-Layout Checklists will be filed under the associated block folder (where one pre-work covers multiple blocks, ensure a copy of the pre-work is filed within each applicable block).
- The Contractor must ensure that they complete Pre-Work meetings with all crew and sub-contractors.



- Field layout must adhere to the Field Marking Standards (see below).
- GPS traverse is the preferred method of boundary and road location using a GPS unit required to collect RIC standards (i.e., GeoXT with hurricane antenna). Boundary Traverse with a GPS can follow one of two methods
  1. Dynamic – Preferred method to use by Taan Forest
  2. Static – To be used in situations where Dynamic Traversing is not working
- Determine locations of WTRA's and other reserves (refer to layout considerations below).
- Collect appraisal data information – Road design, culverts, bridges, distance to rock for roads, reconstruction and construction categories.
- GPS traverse roads for reconstruction using the Taan Reconstruction Data Dictionary. Ensure to collect all required reconstruction appraisal data (Case, Uphill SS, Remaining Road Width, Culverts [replace/ install, stream class and Q100], Quarry Locations, Spoil Site Locations). Also record whether any of the following are required: removal of vegetation, ditching, re-surfacing and/ or road widening. If you are unsure of the Reconstruction Case, take a photo and consult with the Taan Planning Representative.
- Conduct road inspections from block boundary to log dump (or to last inspected road within the last year) using GPS Road Inspection Data Dictionary.

#### Filing Required

- **Inform Mapping via e-mail of new files on server**
- File all raw and corrected GPS data: [Taan Server://Shared/Public Engineering/Contractor/CutblockID/Geomatics/Data](#) within appropriate sub-folders of Final Block Boundary, Final Road, Final WTRA, Final Reserve etc.
- Place all road eng data and road designs under the associated [Taan Server://Shared/Public Engineering/Contractor/CutblockID/Engineering/RoadEng](#) within appropriate sub-folders of Final Road XX, Block boundary etc.
- Appraisal data information to be placed under the associated [Taan Server://Shared/Public Engineering/Contractor/CutblockID/Engineering/AppraisalData](#) (within appropriate sub-folders)
- Final block boundary and road locations allow for the development of the cruise map.
- Update Pro-forma ([Taan Server://Shared/Public Engineering/ Contractor/Pro-Forma](#)) and Cutblock Tracking Sheet (Google Docs) with new areas and volume estimates.

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### **Layout Considerations**

"Tree-length" is used throughout the FSP in regards to the widths of no-harvest and management zones. Tree-length is as defined in the LUO, and the associated LUO Schedule 5. The site specific tree-length (i.e., height assigned) will be documented in the Site Plan. The LUO definition provides two methods for determining the tree-length, depending on if the stand is old-growth or young/ immature, as follows:

1. Using the predominant site-series for the area and then referencing LUO Schedule 5. As site-series information is required to reference Schedule 5, Plan Holders will need to determine the predominant site-series by either using TEM information or by field verifying the site-series. Whichever method is used, it will be documented within the Site Plan.
2. By measuring the tallest trees in the area adjacent to the feature. It should be noted that this method would be inappropriate for areas that have been previously harvested (i.e., there are no mature trees to measure).

Whichever method, 1 or 2 from above, is used, it will be documented within the Site Plan. Where areas have previously been harvested, and the stand has yet to become mature, then method 2 from above will not be used.

### **Adjacent Tenure/ Properties/ Parks & Conservancies**

- Mineral and trapping tenure holders are consulted at the Management Plan and Forest Stewardship Plan level.
- Other adjacent tenure holders (e.g., forest tenures, water licenses), property boundaries, parks and conservancies and community watersheds must be identified on relevant plans and maps and appropriate prescriptions developed to address potential impacts to their areas (e.g., windthrow).
- Taan Planner will carry out notification and consultation with adjacent property owners, water license holders and community watersheds when operations are proposed in the vicinity of these areas. Records will be maintained on file.
- Per the FSP, when operations are proposed adjacent to protected areas, appropriate notifications and measures will be implemented (e.g., windthrow considerations).
- TAUP/ Development area cannot include any of these adjacent tenure/ properties/ Parks and Conservancies. To ensure the harvest boundary will not impact any features found in the adjacent areas the CFI inventory still needs to be completed, information collected, features managed for and reporting completed for the adjacent parks/ conservancies (i.e., within 150m of the block boundary).

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**Permanent Sample Plots**

- The primary objective is to ensure potential PSPs near development areas are identified in the field and managed accordingly.
  - No assumptions are to be made in the field of how to manage the PSP.
  - PSPs must be brought to Taan’s attention immediately when they are discovered.
  - PSPs will be reviewed by Taan and the Lead Engineer for the block.
- The following procedures must be followed:
  - Use the information from PSP geodatabase to locate the PSP.
  - Attempt to locate the plot by conducting sweeps away from the block boundary. Once greater than 300m from all points of the proposed harvest area, searching may cease.
  - If the plot is found mark the corners, plot center etc. with a GPS (Trimble GeoXT, Leica or better – NOT a hand held Garmin) and provide the location to Taan.
  - Take pictures from the plot center in a North, East, South and West direction.
  - Provide a brief report of how the search was conducted and what was (was not) found. Indicate on a map how and where the search for the PSP was completed.
  - If the PSP cannot be found ensure that there is nothing within 300m of the entire block boundary.

**Road Network Management**

- Taan is committed to minimizing new road construction and utilizing existing roads/ temporary roads/ trails to the best extent possible within the following LUs for Landscape Level Biodiversity considerations:
  - Skidegate
  - Masset

**Wildlife**

- Wildlife training (Species at risk, locally important species) will be provided to Planning personnel through the CMS Level 2 training.
- The following key species are known to occur in Haida Gwaii (as identified in the Land Use Order and within the FSC Management Plan as High Conservation Value):
  - Marbled Murrelet (Bird) – strategies included in the LUO/ FSP
  - Northern Goshawk (Bird) – strategies included in the LUO/ FSP
  - Northern Saw-whet Owl (Bird) – strategies included in the LUO/ FSP
  - Great Blue Heron (Bird) – strategies included in the LUO/ FSP
  - Black Bear (Mammal) – strategies included in the LUO/ FSP
  - Barrow’s Goldeneye (Bird)
  - Brown Creeper (Bird)
  - Steller’s Jay (Bird)
  - Hairy Woodpecker (Bird)
  - Pine Grosbeak (Bird)
  - Ancient Murrelet (Bird)
  - Keen’s Myotis (Mammal)
  - Western cowbane (Vascular Plant)
  - Sphagnum subobesum (Moss)
  - Haida Gwaii Slug (Mollusc)
- These key species should be identified on a case by case basis during field work and management strategies are to be included within the Site Plan, where applicable. The primary objective will be to focus stand level retention for other LUO considerations within any critical habitat areas for the key species.

- For information on habitat requirements and management strategies, consult the [BC Coast Species and Ecosystems of Conservation Concern, species fact sheets](#).
- For best management practices for raptors, refer to the MOE "[Guidelines for Raptor Conservation for Urban and Rural Land Development \(2013\)](#)". Additional details are also provided in Table 2 below)
- There are also three Important Bird Areas (IBAs) located adjacent to the forest tenures that must be considered during development and planning stages in the area to ensure that the critical habitat and values are not negatively impacted by the operations in the forest tenure areas:
  - IBA 147 - Lawn Point
  - IBA 145 - Skidegate Inlet
  - IBA 144 - Cumshewa Inlet north to Sheldens Bay

**Recreation**

- In addition to the requirements for established recreation sites and features under the FSP, the following recreation areas have been identified as important sites that must be considered when developing plans and prescriptions for development areas located in the vicinity of these features:
  - Masset Inlet
  - Papa John's Campsite (Yakoun River)
  - Mosquito Lake (trails, campsites, rare plants, old growth, views, etc.)
- Mosquito Lake is an important area to the Mount Moresby Adventure Camp (MMAC). In the event that operations are planned in the area, MMAC must be consulted prior to operations to ensure their concerns are met.

**Large Landscape Level Intact Forests**

- There is an insignificant amount of large level landscape intact forests located within the Taan tenures (1.8% of the intact forest polygon). As a result, any forest management activity in this area will fall within allowable disturbance thresholds (refer to the FSC Management Plan for details). No special management is required within these areas.
- However, in the event that Taan operates within other areas in the TSA that are located within the FSC certified area (outside of the Taan tenure area), then large landscape level forests and established disturbance thresholds must be considered (refer to the FSC Management Plan for details, where applicable).

**Unique Ecosystems**

- The Land Use Order contains requirements for protection of red and blue listed ecosystems that must be considered and protected per the LUO objectives.
- The FSC Management Plan identifies three unique ecosystems of special concern (identified as High Conservation Value):
  - Sitka Spruce Riparian Forests (typically CWH wh1 07/08)
  - Sitka Spruce-Sea Spray/ Fog Forests (outer coast areas, windswept)
  - Limestone Areas
- For the most part, these ecosystems are primarily located in existing protected areas and areas protected under the Land Use Order (e.g., Type I and II streams), and through FRPA requirements (e.g., karst features).

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- Field personnel should become familiar with these ecosystem types and identify/ prescribe appropriate management prescriptions to conserve a component of these key ecosystems in retention areas (addressed in Site Plans).

**Landscape Level Reserves**

- In general, no layout is to occur within Forest Reserves, Northern Goshawk reserves, and Saw-whet Owl reserves.
- Layout should not occur within Cedar Stewardship Areas, unless approved by Taan Planning.

**Ecosystem Representation**

- Where ecosystem representation candidates that are in deficit in relation to LUO targets are at least 0.25ha in size, they must be identified and mapped and removed from the harvest area.
- If the ecosystem is not in deficit, then the area can be harvested and incorporated into the adjacent SU, but must be noted in GIS that it has been harvested for tracking and reporting purposes.

**Mosaics**

- Where ecosystem representation candidates that are in deficit in relation to LUO targets are located in mappable mosaics and the representation of the percent mosaic is at least 0.25ha in size, they must be identified and mapped as a separate stratum and removed from the harvest area. Examples:
  - 1.8ha area has 20% of an ecosystem type that is in deficit (1.8ha x 20% = 0.36ha). This mosaic represents more than the minimum stratum size of 0.25ha and therefore must be mapped and recorded for tracking purposes and removed from the harvest area.
  - 1.8ha area has 5% of an ecosystem type that is in deficit (1.8ha x 5% = 0.09ha). This mosaic represents less than the minimum stratum size of 0.25ha and therefore may be incorporated into the adjacent stratum, mapped and recorded for tracking and can be harvested.
- If the ecosystem is not in deficit, then the area can be harvested and incorporated into the adjacent SU, but must be noted in GIS that it has been harvested for tracking and reporting purposes.

**Ecosystem Representation Management Areas**

- The Eco-Rep Management Zone network (MZ network) is meant to minimize the difficulties in operational planning to address LUO requirements for ecosystem representation and MAMU, while maintaining flexibility. These eco-rep MZ areas have been established to meet the LUO requirements as well as to improve landscape level connectivity.
- Areas identified within the MZ network should be considered yellow-light areas (proceed with caution). In some instances, we may not be able to harvest within the MZ network, depending on what is being managed.
- The following management strategy applies:
  - Planning process proceeds as usual (i.e., pre-layout review of MZ network and eco-rep deficits for the LU in question).
  - If operations need to go into an area identified in the MZ network and the TEM mapping identifies the area as being in deficit with respect to eco-rep targets, then the area must be field verified.

- If the TEM eco-typing is incorrect, the area can be re-classified and the TEM info updated. Development can proceed.
- Where the eco-typing is field checked and is accurate/ correct (i.e., area in question really is a deficit ecotype). Development cannot proceed. Senior planners will review the situation and plan accordingly.
- Alternatively, if field personnel identify an area in the field as being one of the eco-types in deficit, but not mapped as such in TEM, then we are committed to mapping the area in the field, updating the TEM info/ MZ network and managing the area accordingly.

**Stand Level Reserves**

- All reserves and Wildlife Tree Retention Areas (WTRAs) internal to the block boundary must be established in the field.
- Blocks more than 200m wide or 100ha aggregate of adjacent blocks (i.e., group of smaller blocks located in vicinity of each other), must include retention of a minimum of 8sph of dominant and co-dominant trees, in patches or single trees (NDT 1 and 3), 25% of which should be represented by snags, where snags are present. (WTRA or other LUO reserves should be used to fulfill these requirements where possible).
- Per the Site Plan FSC requirements, field work must include a review and documentation of key stand characteristics for the stand level reserves (e.g., stand type, snags, CWD).
- Consider landscape level connectivity when establishing reserves and retention areas.
- The Skidegate LU has a target to achieve an average of at least 20% stand level retention, as measured on an annual basis (i.e., all blocks harvested in each year).

**Wildlife Tree Retention Areas**

- Ensure WTRAs are established consistent with the minimum requirements set out in the FSP. The minimum retention is 3.5% for each cutblock, with an annual average of 7% for each cutblock harvested within the year.
- WTRAs should contain timber and habitat representative of the local stand. Exceptions may be made to reserve habitat features or other areas of high value biodiversity features upon consultation with the prescribing Registered Professional Forester (RPF). For example, target retention areas to conserve unique ecosystems (e.g., antique forests, rare site series) and unique ecosystem features (e.g., caves, mistletoe platforms, mineral licks) and non-forested ecosystems (e.g., wetlands, grasslands, rock outcrops).
- Ensure that existing WTRA/WTP are not located in any planned areas for future development. If this is not possible, then approval must be obtained from the Taan Planner prior to conducting any layout within any adjacent WTRA/WTP.

**Green Up/ Adjacency**

- FRPA sets out requirements for maximum cutblock size and adjacency (Forest Planning and Practices Regulation section 64 and 65). These requirements are also addressed in the FSP and in the Site Plan.
- FRPA defines “adjacent” as an area that is sufficiently close to a cutblock that, due to its location, could directly impact on, or be impacted by, a forest practice carried out within the cutblock.
- “Sufficiently close” would depend on the issue being considered. For a goshawk nest, 1km may be close; for windthrow, 2 tree-lengths from the timber edge may be close; for visuals, 10km may be close.

- The general “rule of thumb” that Taan follows is that the minimum distance between blocks that exceed the maximum cutblock size requirements (e.g., >40ha combined, not greened up, not retention as defined) is 400m. Moreover, 400m is the guideline for determining adjacency. Available research shows that for edge influence and interior forest, you generally need a minimum of 400m between blocks in order to avoid having one block affect another.
- The minimum distance between blocks may be reduced to as low as 300m, provided there is sufficient supporting rationale that is approved by Taan Planning. Considerations and rationale include future harvesting opportunities (i.e., ensuring an economical leave patch between blocks).
- It is also important to note that per the definitions of retention in FRPA, the 40% basal area retention does not mean 40% block area retention.

**Riparian Classification & Retention**

- Where some or all of the forest within Type 1 or Type 2 habitat and reserve zones or active fluvial management zones and forested swamps >0.25ha, or northern goshawk nest areas have been previously altered or harvested, provide for recruitment of functional riparian forest through natural processes and voluntary management intervention.
- Upland Streams, maintain sufficient vegetation to maintain stream bank and channel stability for direct tributaries to Type 1 and Type 2. Upland streams with incised channels and steep gradients, retain sufficient amount of trees and understory vegetation to maintain riparian plant communities that are dependent on high humidity micro-climates.
- Additional classifications include non-classified drainage (NCD) or Fisheries Sensitive Feature (FSF) which is a non-classified drainage but is less than 20% and/ or connected to fish.
- There are no temperature sensitive streams identified on Haida Gwaii.
- Retain non-commercial trees and understory vegetation along streams, lakes and wetlands for protection of riparian functions, to the greatest extent possible. Ensure 7m machine free zones are prescribed in site level plans (except for crossings).
- Riparian management prescriptions should strive to implement fall and yard away prescriptions wherever possible and limit fall and yard across to situations only where there is no other practicable option.

**FSC Riparian Budgets**

- The overall objective of the Riparian Budget Tracking is to ensure that FSC requirements are met at the watershed level for each stream class and that for watersheds that currently have a deficit, that we are not adding to, or exacerbating, those deficits (i.e., our proposed harvesting is not making the deficits worse). The target at the block/ groups of blocks level (Budget Tracker Worksheet) is zero or positive balance for each stream class.
- In addition to the LUO & FRPA riparian reserve and management zones that are required under the FSP, there are some riparian areas that require additional reserve zones under the FSC Requirements:
  - Upland Streams – S5a/S5b, S6a/S6b
  - Unclassified Lakes & Wetlands
  - Estuary & Marine - Open water beach and low shoreline, Open water bluffs and cliffs, Protected waters



- Under FSC, the following riparian classifications exist and are supplemental to the LUO/FRPA and the FSP:
  - **S5a streams** are defined as stream class S5 under FRPA, that are ≤500m upstream of Type 1 or Type 2 streams (fish-bearing streams) or other fish bearing waterbody (i.e., lake, wetland or ocean)
  - **S6a streams** are defined as stream class S6 under FRPA, that are ≤250m upstream of Type 1 or Type 2 streams (fish-bearing streams) or other fish bearing waterbody (i.e., lake, wetland or ocean)
  - **S5b and S6b streams** are defined as not S6a or S5a and are S5 and S6 streams (respectively) under FRPA.
- Planners must ensure that for each development area or groups of development areas in the same watershed, that FSC Riparian Budgets are achieved (per the Riparian Assessment Form):
  - Taan will strive to meet the FSC riparian budgets by establishing riparian reserves for all hydrological feature classes, consistent with at least the minimum widths indicated in Table 1 below.
  - For each development area (i.e., cutblock, or group of openings under the same Site Plan), or group of cutblocks within the same watershed, a tracking sheet (or equivalent) will be developed and will indicate the following (i.e., all blocks on same worksheet):
    - all of the hydrological features associated with the cutblock (including those features within up to two tree-lengths of the block boundary)
    - a breakdown of the reserve areas (i.e., length of features x minimum buffer width required) associated with the identified features and a comparison with the FSC riparian minimum buffer requirements, as indicated in Table 1.
    - tracking sheet and associated mapping will be maintained such that the information can be compiled on a regular basis (annually at a minimum) for analysis purposes
  - Where Taan wishes to employ the budget approach (see example below) within a particular development area (i.e., move the riparian management zones associated with a particular feature class), analysis must be completed and show that for the development area or group of blocks in same watershed, the riparian budget will still be maintained (i.e., cannot have a riparian budget deficit associated with any individual development area or group of blocks, but a zero balance is ok; as that means we have sufficient amount).
  - Taan may also choose to incorporate riparian reserves in areas that are already constrained for other purposes (e.g., monumental cedar), provided that the area is within the Total Area Under Prescription (TAUP). The contributions of existing reserves/ constrained areas within 120m adjacent to Type I, Type II, Upland Streams (S5/S6), unclassified lakes/ wetlands and ocean edges can be used to count towards riparian budget requirements. In some rare cases, it may be sufficient to account for areas outside of the TAUP in the budget calculations where sufficient/ strong rationale can be provided and the area incorporated in the calculations is not anticipated to be harvested.
  - All analysis and associated rationales will be documented as part of the Site Plan supporting documentation.



### Riparian Budget Example

- As noted above, when managing riparian areas/ hydrological features, Taan has two options:
  - to apply the minimum buffer widths along the length of the feature, or
  - to utilize the riparian budget option. An example illustrating these two approaches is provided below.
- The minimum FSC riparian budget requirements are outlined in Table 1 (below).

#### Uniform Buffer Option

Cutblock Area = 30.0ha

Non-classified lake shoreline associated with the cutblock = 250m

Riparian buffer required along lake (see Table 1 below) = 2.25m

Riparian budget requirement for the cutblock = 2.25m x 250m = 562.5m<sup>2</sup> (or 0.6ha)

#### Riparian Budget Option

Based on the information above, the riparian budget requirement for the cutblock = 0.6ha.

Rather than applying the uniform 2.25m wide buffer along the entire length of the lake area associated with the cutblock, Taan could opt to apply the riparian buffer in a non-uniform fashion, as follows:

0m of buffer for 125m of the shoreline and 4.5m of buffer for the remainder of the shoreline, resulting in:

$(0m \times 125m) + (4.5m \times 125m) = 562.5m^2$  (or 0.6ha), thus meeting the minimum budget requirements for the cutblock for unclassified lakes.

It should be noted that the budget approach is meant to provide operational flexibility in meeting budget requirements and that Taan is encouraged to focus the riparian reserve areas where they will provide the greatest benefit/ value.

#### Management Considerations

- When implementing the FSC Riparian Budgets, several factors must be considered when applying the minimum reserve zones and selecting which option to use for implementation:
  - Downstream connectivity and proximity to fish habitat, water license intakes, community watersheds, etc.
  - Focus of riparian reserve zones on areas where the most "value" may be (e.g., proximity to fish or other wildlife habitat, unique ecosystems, LUO HTHF or HTFF, presence of snags and large woody debris, etc.
  - Implement prescriptions that promote the use of fall and yard away techniques from streams and reserve/ management zones where the harvesting system and stand characteristics permit (e.g., considering windthrow). Utilize this prescription where it is anticipated it can be achieved.
  - Consider increasing the FSC minimum reserve requirements (where applicable) to a minimum of 10m (either uniform distribution or using the budget approach), consistent with the recent monitoring results from the FREP program that reports that efficacy of riparian reserves is significantly improved when they are at least 10m wide.

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Table 1: Riparian Management Areas

Class		Description	LUO RRZ	LUO RMZ	FSC Minimum Reserve	
Streams	Type 1 Fish Habitat	>1.5m width and ≤ 5%, and fish or potential fish	2.0 tree length (+/- 0.5 tree lengths, provided no net loss)	-	-	
	Type 2 Fish Habitat	fish or potential fish but not Type 1	1.0 tree length	0.5 tree length (avg. width)	-	
	Upland Stream	Stream reach, not Type 1 or 2	maintain 70% of forests in upland stream areas as hydrologically recovered UNLESS intergovernmental process and watershed assessment completed		S5a/S6a – 33.0m S5b/S6b – 4.5m*	
Lakes & Wetlands	Type 1 Fish Habitat	>1ha, upstream to Type 1	2.0 tree length	-	-	
	Type 2 Fish Habitat	>1ha, upstream to fish but not Type 1	1.0 tree length	-	-	
	Non-Fish Wetlands/ Lakes		FPPR RRZ	FPPR RMZ	FSC Minimum Reserve	
	W1	>5ha	10	40 (BA Retention 0-100)	2.25m*	
	W3	1-5ha	-	30 (BA Retention 0-100)		
	W5	2 or more W1 wetlands within 100m of each other; two or more other wetlands within 60m of each other	10	40 (BA Retention 0-100)		
	L1A	≥1,000ha	-	-		
	L1B	5-999ha (or if designated by DM)	10	-		
	L3	1-5ha	-	30 (BA Retention 0-100)		
	Unclassified	Lake or wetland not classified as Type 1 or Type 2	-	-		
Estuary & Marine	Type 1 Fish Habitat	an estuary or marine interface zone connected by a perennial or seasonal stream to Type 1 fish habitat	2.0 tree lengths	-		-
	Unclassified (i.e., not considered Type 1 Fish Habitat)	Open water beach and low shoreline	-	-		32.5m
		Open water bluffs and cliffs	-	-		13.75m
		Protected waters	-	-	23.75m	
Active Fluvial Units			-	1.5 tree lengths	-	
Forested Swamps >0.25ha (i.e., CWHwh1 12 and CWHwh2 06 eco-types)			-	1.5 tree lengths; 70% mature and old forest (avg. width)	-	

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Notes: \* Consider increasing the minimum reserve requirements (where applicable) to a minimum of 10m (either uniform distribution or using the budget approach).

**Type 1:** May alter up to 5% of the Reserve Zone for road and bridge construction, or address safety concern and no practical alternative AND integrity is maintained OR can alter up to 5% if intergovernmental process.

**Type 2:** May alter up to 5% of the reserve zone (no intergovernmental process required); May reduce the management zone by up to 20% (no intergovernmental process required); May also reduce the combined area of the RRZ and RMZ further with intergovernmental process, ensure maintain integrity, develop and implement adaptive management process AND total amount old and mature forest is reduced by no more than 20%.

**Upland Stream:** Direct tributaries to Type 1 and Type 2 – retain sufficient vegetation to maintain stream bank and channel stability. Incised channels and steep gradients – retain sufficient amount of trees and understory vegetation to maintain riparian plant communities that are dependent on high humidity micro-climates.

**Active Fluvial Units:** May reduce mature and old forest RMZ by up to 10%.  
May reduce by additional 10% provided integrity protected and an adaptive management plan is developed and implemented.

**Forested Swamps:** May reduce mature and old forest to 60% provided that level sufficient to maintain integrity of the forested swamp and an adaptive management plan is developed and implemented.

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## Other Reserves/ Retention Requirements

Table 2: Reserve/ Retention Requirements

Description	Reserve Zone	Mgmt. Zone	Comments
Red Listed Ecological Communities $\geq 0.25$ ha	Protect each occurrence.		May alter up to 5% of the community in a development area if required to address road access or safety concerns
Blue Listed Ecological Communities $\geq 0.25$ ha	Protect each occurrence.		May alter up to 30% of the community in a development area if required to address road access or safety concerns or an intergovernmental process is completed. May alter up to 30% for any other reason, provided intergovernmental process completed.
Bear Dens	20m	1.0 tree length (avg. width)	May alter or remove bear den and/ or the Reserve Zone if intergovernmental process is completed, is required to address road access or safety and alteration does not occur during winter hibernation season (November 1-May 15). May alter or remove trees in Management Zone (outside of hibernation season) to accommodate road and bridge requirements where no other practicable option exists, accommodate road maintenance or deactivation, removal of danger trees, brushing and clearing of right of way, for safety, on any existing road under active tenure or to mitigate windthrow. In Management Zone, maintain suitable Cw and Yc, trees for bear den recruitment. Focus Stand Level Retention on snags, stumps and logs >80cm in diameter.
Northern Goshawk Nests	200ha	-	Spatial Reserves and reserve zones may be reduced, provided an intergovernmental process is completed, the reduction is required for road access and no other practicable option exists or for safety concerns, reduction does not occur during breeding season <u>and</u> there is no net loss to the reserve area 800m restricted activity zone (i.e., no harvesting or road building) from the nest location during breeding season (Feb 15-Sept 1 per IWMS). Nests must be reported to Gov. & Haida
Great Blue Heron Nests	$\geq 45$ ha and min distance 350m from nest	-	150m restricted activity zone from no harvest zone during breeding season (February 15-August 31 per IWMS) unless confirmed by qualified professional to be inactive for three consecutive years. Nests must be reported to Gov. & Haida
Northern Saw-whet Owl Nests	10ha (centered on nest)	-	Where practicable, maintain core nesting areas within stand level retention across the landscape with max inter-patch spacing of 1,400m. Nests must be reported to Gov. & Haida
Keen's Myotis	-	-	Associated with cool, wet forests and karst features. Protect the integrity of the ecosystem and features Timing restrictions for maternity sites May 15-Sep. 30; hibernaculum sites Oct. 1-May 31.
Raptors (not protected under the LUO)	Eagle (undeveloped area) 200m centred on nest Sharp Shinned Hawk (undeveloped area) 500m active nests	100m timing restriction	Protect all nests (active or not) of Bald Eagle and Peregrine Falcon. For all other raptor species, protect all active nests. Recommended reserve zones may vary depending on the species, rural versus urban locations and ability of the species to "co-exist" but generally is 200m-500m in underdeveloped areas, 100m-200m in rural areas, 1.5 tree lengths or 50m from cliff in urban areas. The recommended buffer zone for timing restrictions is 100m. The following guidelines for timing restrictions during breeding season can be used: Bald Eagle February 5-August 31 -Peregrin Falcon March 30-July 20 Taan may wish to seek advice from professional biologists in some cases for more site specific BMPs.

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Table 2 continued:

Description	Reserve Zone	Mgmt. Zone	Comments
Haida Traditional Heritage Feature - Class 1	500m (+/-0.5 tree length provided no net loss)	-	May reduce area of Reserve Zone provided an intergovernmental process is completed; and the reduction is required for road access or other infrastructure or to address safety concern and no other practicable option exists. Where area in reserve zone previously altered or harvested, provide for recruitment (through natural processes and management intervention)
Haida Traditional Heritage Feature - Class 2	100m (avg. width) (+/-0.5 tree length provided no net loss)	-	May alter, remove or reduce the feature or Reserve Zone provided an intergovernmental process is completed; and the reduction is required for road access or other infrastructure or to address safety concern and no other practicable option exists. Where area in reserve zone previously altered or harvested, provide for recruitment (through natural processes and management intervention)
Haida Traditional Forest Feature - Class 1	1.0 tree length (avg. width)	1.0 tree length (avg. width) (+/-0.5 tree length in any one location, provided no net loss)	May reduce the Management Zone area provided intergovernmental process is completed; and the reduction is required for road access or other infrastructure or to address safety concern and no other practicable option exists.
Haida Traditional Forest Feature - Class 2	Provide sufficient stand level retention to maintain integrity for min. 50% of features in development area		Where area in reserve zone previously altered or harvested, provide for recruitment (through natural processes and management intervention)
Haida Traditional Forest Feature - Class 3	Protect in stand level retention, where practicable		Where area in reserve zone previously altered or harvested, provide for recruitment (through natural processes and management intervention)
Cw & Yc – cutblock ≥10ha, combined pre-harvest composition >30%	Min 1ha patch and range of diameters: retain min. 15% of the combined pre-harvest composition		-
Cw & Yc – cutblock ≤10ha, combined pre-harvest composition >60%			-
Western yew patches (Patch = five or more trees and each tree is within 5m of another yew tree)	Protect all patches with stand level retention (individuals where practicable)		Patches may be altered or removed to accommodate operational requirements for road and bridge construction, where no other practicable option exists.
Protect all CMTs, Cultural Cedar Stands & Monumental Cedar >120cm CMT = modified <1920 Monumental = visibly sound Cw/Yc >120cm dbh and 7m log length. Cultural Cedar Stands – 3 or more CMT, monumental cedar or combination, each tree within 50m of another tree	0.5 tree length	1.0 tree length (avg. width)	Cultural Cedar Stands, CMTs and monumental cedar may be altered or removed provided an intergovernmental process is completed; the alteration or removal is required for road access, other infrastructure, or to address a safety concern and no other practicable option exists; and any CMT or monumental cedar harvested will be provided to the Haida. Monumental Cedar not located in cultural cedar stand and 100cm-120cm may be harvested provided that the greater of 10% or 1 monumental cedar is retained within the development area and confirmed through intergovernmental process that the monumental cedar is not required for cultural use or harvesting the monumental cedar is required for road access, other infrastructure, or to address safety concern and the monumental cedar will be made available to the Haida, or other specific measures will be identified.
Monumental Cedar – not located in cultural cedar stand and 100cm-120cm	0.5 tree length	1.0 tree length (avg. width)	May reduce Reserve Zone provided an intergovernmental process is completed; the alteration or removal is required for road access, other infrastructure, or to address a safety concern and no other practicable option exists; and the integrity of the stand, CMT or monumental cedar maintained.

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Description	Reserve Zone	Mgmt. Zone	Comments
			<p>May reduce the Management Zone provided an intergovernmental process is completed, the reduction is necessary to address operational constraints or a safety concern and the integrity of the reserve zone is maintained.</p> <p>Maintain or recruit min. 90% of the management zone as mature/old forest.</p>

**Assessments**

- The majority of assessments completed by the Contractor will be collected during the Final Block Layout. Where additional assessment work is required, such as that required of specialized professionals the contractor must notify the Taan Planning Representative for approval and to confirm whether any other services are required.
- Assessments are to be completed, signed and filed on the server under the associated block file under “assessments” and folder name of the assessment. [Taan Server://Shared/Public Engineering/Contractor/CutblockID/Assessments.](#)

**Streams, Watercourses and Gully assessments**

- All streams, watercourses and gullies within and immediately adjacent (i.e., typically within 150m) to planned harvest or road construction areas must be accurately mapped and assessed using the Taan Riparian Assessment Field Card (or equivalent).
- Where prior classification of the stream or watercourse is questioned, a Taan Riparian Assessment Field Card (or equivalent) must be completed (refer to appendices).
- Cards must be retained on file for future reference.
- Where previous assessments have been completed (i.e., by other layout crews), review the assessment to confirm the correct classification of the watercourse. Where the classification is in doubt, reassess the watercourse using a Taan Riparian Assessment Field Card (or equivalent), located on [Taan Server//Shared/Public/Forms & Checklists/Planning.](#)
- A Taan Riparian Assessment Field Card must be used to collect base information when using digital methods for data collection.
- In addition to the Riparian Assessment Card, where gullies are present complete a “Gully Assessment Card” – MFLNRO, or equivalent, located on [Taan Server//Shared/Public/Forms & Checklists/Planning.](#)
- Gullies may have to be reviewed by a Terrain Specialist. The Gully Assessment Card must be provided regardless of any recommendations made by the Terrain Specialist.
- Use Fish Trapping (with permit on person) to confirm non-fish streams where the presence of fish may be expected. Fish Trapping may not be used in known fish streams to define the stream as non-fish.
- Fish traps must have the Permit # written on an attached tag.
- A minimum of two traps must be set above the fish barrier. One trap must be set below the barrier as a control.
- If fish are not caught on the first settings, a second setting must be established in a separate season when fish are likely to be present.

- Fish sampling sheets must include:
  - Fish Collection Permit #
  - Stream name with stream characteristics; a Taan Riparian Assessment Field Card (or equivalent) must be filled out
  - Date in, time in and date out of traps
  - Water temperatures
  - Summary of trap including number and species of fish caught, if any or a comment that no fish were caught.
- Use Professional Biologists – Fish shocking where fish / non-fish is undetermined.
- Final report includes a brief summary and map highlighting fish, non-fish, stream names, riparian classes gullies and recommended stream or gully prescriptions.

#### Alluvial Fans

- Alluvial and colluvial fans are located at the bottom of confined channels, and are built from sediment or woody debris deposition in unconfined, lower gradient areas. (MOFR Forest Research Technical Report TR-034, March 2006). To review the report visit: <http://www.for.gov.bc.ca/rCO/research/georeports/tr-034.pdf>
- Review aerial photos, overview maps, and Terrain Stability Maps of the area in order to assess natural landslide processes, fans, etc. in the area of the proposed activity.
- All proposed blocks or road locations within or adjacent to an identified fan must be assessed by a qualified professional. Recommendations resulting from the assessment must be implemented within the site level plans. Identify any areas of special concern noted in the assessment on the appropriate maps.
- If special measures are required (over and above the SOP requirements) or there are areas within the cutblock/road prism that warrant special concern, then prescribe appropriate prescriptions within the Harvest, Road Construction or Deactivation Plans and identify those areas on the maps.

#### Archaeological Impact Assessment (AIA)

- AIAs are conducted in areas where there are anticipated archaeological features.
- Schedule an AIA if one or more of the following are found:
  - CFI surveyor indicates the need for an AIA
  - One or more CMTs have been discovered – Archeologists will inventory them, not the CFI surveyor
  - An HTHF is discovered
  - <25m elevation or subsurface features are expected
  - Development is planned between at least two archaeological features that are within 100m of each other or documented archaeological evidence in an adjacent area
- AIAs are completed by an Archaeologist or under the direction of an Archaeologist.

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#### Cultural Features Identification survey

- A field assessment must be conducted under the direction of a person certified by the Council of the Haida Nation to identify cultural features, prior to commencement of layout to identify CFs that may be control points for engineering or that may further impact the blocks development.
- The CFI survey will be conducted in accordance with the CFI Surveyor's accreditation course. Use Taan's survey procedures developed with the CHN located: [Taan Server://Shared/Public/Forms & Checklists/Planning/Non-CMS/HLV surveys](#).
- CFI surveys should be conducted outside the planned block as well (minimum 150m) – ensuring that outside block features are identified to ensure the block boundary does not impact the reserves/ management zones of features outside of the planned boundary, as well as in block features.
- If during recce work or final layout areas of the block are removed because of CF features ensure all information is collected and provided to mapping for annual updates to the CHN for these areas as well.
- Monumentals, crab apple and clumps of yew need to be easily identifiable in the field for cruising and logging crews. Refer to the Field Marking procedures (below) for specific requirements related to Monumental Cedar.
- Complete the report and mapping in accordance with the procedures (note the CFI report does not require a map, however Taan does). The CFI map must include all of the areas surveyed, even if no features were found. Develop a harvest and leave strategy, block alterations, harvesting prescriptions with the Taan Planning Representative.
- Create a package to support the Intergovernmental Process where required that includes the Information Map, Photos of the monumental cedar to be harvested and the CFI report signed off by a certified surveyor.
- File GPS data for the CFI survey under the associated [Taan Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics/Data or Shared/Public Engineering/Contractors/CutblockID/Assessments](#). **Inform mapping of new information placed in this folder.**
- File the report and associated data under the [Taan Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Assessments/HLV & Arch or Shared/Public Engineering/Contractors/CutblockID/Assessments](#).
- Once the CFI's have been reviewed by an RFT or RPF for accuracy and completeness, they are to be submitted to the CHN via email to: [CFI@HaidaNation.com](mailto:CFI@HaidaNation.com).

#### Terrain Stability Assessment

- Generally, terrain stability field assessments are completed when planning activities are proposed within or adjacent (including down-slope) of terrain:
  - mapped/ rated as moderate or high likelihood of landslides,
  - mapped/ rated as high or very high erosion potential, or
  - >60% slopes.
- Regardless of the slope, where there is evidence of potential slope failure (e.g., tension cracks, etc.), ensure the area are communicated to the prescribing RPF and consider consulting a terrain specialist.
- Road construction and harvesting is not permitted on areas with high likelihood of landslide initiation or areas with very high potential for snow avalanche initiation.

- Road construction and harvesting is not permitted unless measures are implemented to reduce risk of landslide or snow avalanche or prevent erosion and sedimentation for the following:
  - Areas of moderate likelihood of landslide initiation high or very high landslide induced stream sedimentation hazard, or
  - Areas of moderate likelihood of landslide initiation and high to very high likelihood of the landslide reaching areas of human habitation
- Consider windthrow hazards in areas adjacent to areas with high or moderate likelihood of landslide initiation and prescribe treatment measures, where applicable.
- Terrain assessments are conducted by a Terrain specialist.

#### Windthrow Assessments

- Windthrow assessments must be completed for every block.
- Use Taan WF Assessment information located on [Taan Server//Shared/Public/Forms & Checklists/Planning](#).
- Final assessment report includes a brief summary report & Map indicating hazards along boundary segments and detailed rationale for Tree Crown Modification or not.

#### Karst Assessment

- A karst assessments is required on all blocks with karst features and/ or Limestone.
- Assessments are generally conducted by a qualified specialist where there are Karst Features beyond general sinkholes and fissures.

#### Hydrologic Assessments

- Hydrologic assessments are completed when planning activities are proposed within or adjacent (including up-slope) of recharge areas for springs for domestic or irrigation water sources.

#### Visual Assessments

- In the event that the proposed activity is located within a designated scenic area, or other visually sensitive area where visual considerations are desired, visual assessments are to be completed using the FPC Visual Impact Assessment Guidebook and the Visual Landscape Design Training Manual (or equivalent).
- Assessment summaries must clearly identify the Viewpoint ID, the visual quality objective and polygon ID and the planned percent alteration considering all previously harvested and planned cutblocks in the landform (consistent with the recent expectations memo from MFLRNO regarding visual assessments). Planned alteration must be within the limits (visual objective) for the landform within the designated scenic area.
- Confirm established/ selected viewpoints with the Taan Planner. You may deviate slightly from selected viewpoints if field work identifies any obstructions (e.g., roadside brush). Obtain photographs from the obstructed viewpoint for due diligence.

- Several photographs should be taken from each viewpoint, using different angles and panoramic shots where appropriate. Photographs must capture the entire landform with proposed alterations or if possible, the visible portion of the VLU/ VSU polygon. Number each photograph and record details including:
  - viewpoint number and viewpoint location
  - viewpoint importance (Major/ Minor/ Potential)
  - viewpoint coordinates (Lat./ Long. or UTM inc. elevation (m))
  - viewing distance (Foreground/ Middleground/ Background)
  - viewing duration (High/ Moderate/ Low)
  - focal length of camera lens (mm)
  - direction of view (degrees)
- Provide the files/ information on the Taan Server for the mapping department to generate the DTMs.

**Cruise**

- A Cruise is completed after the block boundary is confirmed.
- Cruising is completed in accordance with the current version of the Ministry's Cruise Manual (note that these are typically updated several times per year).
- Cruise volume will be used to finalize the Pro-forma.

**Stand Level Retention**

- Site Plan Foresters are responsible for completing walk through assessments of all planned retention areas and reserves within the TAUP/ Development Area and documenting the required detail within the Site Plan Template under the FSC Considerations. Cruise data may be used to assist with the summary, but it must be supplemented with field walk through information/ comparisons.

**Forest Influence**

- At this time, there are no specific management strategies established to manage for, or to meet any targets for, forest influence. However, as part of the monitoring strategies, Taan cutblocks will be assessed for forest influence to determine the levels that are being achieved through implementation of the LUO and the portion of cutblocks that currently meet the requirements of a retention silviculture system.
- During the Site Plan process, the forest influence for each cutblock will be calculated as a GIS exercise according to the following interim criteria (based on a review of guidebooks and existing processes in place by other licensees):
  - Forest influence extends into the cutblock from an edge or group of trees for a maximum of 1 tree length.
  - The minimum age of adjacent stands that contribute to forest influence is >50 years old using forest inventory (i.e., adjacent clear cut doesn't get to count).
  - The minimum patch size to be used is 0.25ha (i.e., patch sizes less than 0.25ha do not contribute to forest influence).
  - Use inventory for all adjacent stand ages (in circumstances where field crews report a discrepancy in inventory ages, the field measurements may be used in place of inventory).
  - All edges/ patches that contribute to forest influence have to be established as long term retention (i.e., WTRA and LUO RZ/MZ but not retention areas unless the Site Plan specifically identifies the retention areas as established for long term retention).



- Forest Influence is calculated by: all long term retention ha + cut area within 1 tree length of timber edge/ TAUP.
- This criteria will be reviewed at a later date once a sample of calculations have been completed and results are reviewed as part of the monitoring program.

#### Permanent Access Calculations

- Permanent Access calculations will be completed by Engineering and the Site Plan Forester for every block that contains roads. Information is used to calculate the Net Area to be Reforested and to accurately map road widths for Site Plan Standard Units.
- Permanent Access site degradation calculations will be completed using the Taan Site Degradation Excel Spreadsheet located on [Taan Server//Shared/Public/Forms & Checklists/Planning](#).
- PAS - total road length and side slopes will be required to determine the area of road within the Total Area Under Prescription (TAUP) .
- NAR - all roads through the cutblock harvest area are used to calculate the NAR (gross harvest area minus the road area within the cutblock).
- Provide Mapping Department with the road widths for adding to the maps.
- Ensure the estimated Permanent Access Percentage does not exceed 7%. Where the limits are permitted to be exceeded (e.g., safety, topography constraints, off-setting, etc.), ensure the rationale is consistent with the allowable variances and is documented to file.

#### Sensitive Soils

- Consult inventory information regarding identified sensitive soils (where applicable)
- Identify "Sensitive Soils" on all Plans/ Maps and ensure adequate management prescriptions are developed to ensure minimal soil disturbance in these areas (e.g., timing restrictions, use of puncheon or soil mats, etc.).

#### Harvest & Road Planning

- Identify any domestic or irrigation water sources/ intakes within 100m of the planned harvest or road construction areas (consult GIS map layers). Ensure any features are identified on site level maps/ plans.
- Plan road locations to minimize stream crossings and construction of roads/ landings in Riparian Management Areas.
- Consider new road construction and ROW width impacts to ECA and watershed recovery numbers.
- If operations are planned within the RMA, other than crossings, ensure no other options exist, determine the RMA infringement distance and notify the Taan Planning Representative that an RMA infringement rationale will be required.
- Where going through Type I and II reserves and management zones consider LUO allowances permitted (i.e., 5%, 10% limits).
- Plan road locations, landings, backspars trails and skidroads in manner that minimizes disruption of natural drainage patterns (i.e., adequate culverts, minimize road widths).
- Ensure plans/ prescriptions include applicable timing restrictions (e.g., structure installation/ in stream works in accordance with standard Fish Timing Windows stipulated by MoE and DFO. Variances to the standard fish timing windows must have written approval from DFO; wildlife timing restrictions (e.g., winter hibernation, nest sites, etc.)).

- Machine free zones of 7m must be established on all streams, lakes, wetlands, and marine shorelines with the exception of crossings or other approved infrastructure or restoration of stream channel functions and only if it can be demonstrated that no significant environmental damage will result.
- Ensure yarding does not disturb stream channels.

**Deflection Lines & Equipment Specifications**

- Unless otherwise specified within the Plan or Contract, the following parameters should be followed:

**Table 3 - Deflection Lines & Equipment Specifications**

Harvest Method	Tower Height (meter)	Yarding Distance (meter)	Minimum Deflection (%)	Maximum Backspar Height
Swing Yarder	18m	0-150m 150-250m 250+	6% 8% 10%	5m for mobile backspar, otherwise 2m
Ground Based	n/a	150m (favourable) 75m (adverse)	40% (max slope) 25% (max slope)	n/a

**Road Running Surfaces & Alignment Controls**

- Default road design parameters are summarized as follows:

**Table 4 - Road Layout & Design Specifications**

Grades		Running Surface & Ditches	
Favourable	Adverse	Width	Depth
Sustained: 18% Short Pitch: 24% Switchback: 15%	Sustained: -12% (-15% if straight) Short Pitch: -15% Switchback: -8%	All roads: 5m Ditches: 0.25m	Surface: 0.25m Ditch: 0.7m

Further guidelines are referenced from Table 2 of the Forest Road Engineering Guidebook (June 2002) (see below).

**Table 2. Summary of alignment controls for forest roads.**

Stabilized Road Width (m)	Design Speed (km/h)	Minimum Stopping Sight Distance <sup>a</sup> (m)	Minimum Passing Sight Distance for 2-Lane Roads (m)	Minimum Radius of Curve (m)	Suggested Maximum Road Gradient <sup>b,c</sup>				
					Favourable S	P <sup>d</sup>	Adverse S	P <sup>e</sup>	Switchbacks
4	20	40		15	16%	18% for distance <150 m	9%	12% for distance <100 m	8%
5-6	30	65		35	12%	14% for distance <150 m	8%	10% for distance <100 m	8%
	40	95		65					
8+	50	135	340	100	8%	10% for distance <200m	6%	8% for distance <100m	6%
	60	175	420	140					
	70	220	480	190					
	80	270	560	250					

**NOTE:** These are suggested alignment controls for average conditions on forest roads. Variations can be expected, depending on, for example, site conditions and time of use.

- <sup>a</sup> For two-lane and single-lane one-way roads, multiply the minimum stopping sight distance by 0.5.
- <sup>b</sup> There are no absolute rules for establishing maximum road gradient. Maximum grades cannot generally be established without an analysis to determine the most economical grade for the site-specific conditions encountered. The maximum grade selected for design purposes may also depend on other factors such as: topography and environmental considerations; the resistance to erosion of the road surface material and the soil in the adjacent drainage ditches; the life expectancy and standard of road; periods of use (seasonal or all-weather use); and road surfacing material as it relates to traction, types of vehicles and traffic, and traffic volume. Apply other grade restrictions in special situations. For example:
  - On horizontal curves sharper than 80 m radius, reduce the adverse maximum grade by 0.5% for every 10 m reduction in radius.
  - As required at bridge approaches, and at highway and railway crossings.
- <sup>c</sup> S – sustained grade; P – short pitch
- <sup>d</sup> Design maximum short-pitch favourable grades so that they are followed or preceded by a section of slack grade. The average grade over this segment of the road should be less than the specified sustained maximum.
- <sup>e</sup> Design maximum short-pitch adverse grades as momentum grades.

**Culverts & Bridges – Major Structures**

- At Taan all bridges 6m and greater in length are designed by a Professional Engineer.
- A wood box culvert does not exceed 6m center of bearing (COB) in length. Structures greater than 6m COB are bridges that require a Professional of Record to design the crossing which includes the general arrangement drawing, complete field reviews, complete and sign a Crossing Assurance Statement and prepare as built / record drawings. For Taan the Professional of Record will be a Professional Engineer:
  - A pipe having a diameter 2000mm or greater
  - A pipe arch having a span of 2130mm or greater
  - An open bottom arch having a span of 2130mm or greater
  - flow rate greater than 6m<sup>3</sup>/sec

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- When installing wood box culverts and major culverts refer to the following:
  - MFLNRO Engineering Manual – Appendix 3.5
  - FERIC Log Bridge Construction Handbook (1980)
  - Forest Road Engineering Guidebook (June 2002), Table 8
  - Guidelines for Professional Services in the Forest Sector – Crossings (July 2014)
- Flow rates must be calculated using the following documents or items (or equivalent):
  - Taan Riparian Assessment Field Card
  - Hydrologic Flow Calculation Excel Spreadsheet
- Refer to the Operations SOP for the design and construction criteria for wood box culverts.

**Culverts & Bridges General**

- All crossings require a Coordinating Registered Professional. The CRP is responsible for planning and coordinating all the professional services for the crossing project including the design, field reviews, as built/record drawings and Crossing Assurance Statement. The CRP must direct those activities with sufficient oversight and supervision such that they can take overall responsibility and accountability for the crossing. The CRP may also be the Professional of Record.
- Culverts and bridges must be established in the field at all streams and natural drainages (unless a Ford is prescribed).
- Unless otherwise specified in the Plan or Contract, Q<sub>100</sub> flow rates for culvert sizing will be used.
- Unless otherwise specified in the Plan or Contract, the following minimum culvert sizes apply:
  - all streams, 600mm (CMP); and
  - non-classified drainages, 500mm (CMP) or 450mm High Density Polyethylene (HDPE). Gravel/ rocky soils or materials must be available/ used (fine sand or silt material is not acceptable).
- The equipment used for construction of a bridge, major culvert or stream culvert is situated in a dry stream channel or is operated from the top of the bank except when crossing the stream channel.
- MoE approval is required for any changes in and about a stream that are of a complex nature. Notification may be provided to MoE (i.e., no approval process) for works that don't involve any diversion of water, may be completed within a short time frame and will have minimal environmental impact.
- At least 3 days notice will be given to any persons who are lawfully diverting or using water under the Water Sustainability Act who may be adversely affected by proposed changes in and about a stream (general guideline of within 1Km). This notice will be given prior to commencement of the work in and about the stream. An adequate supply of water will be supplied to those affected persons, if required.

Average Stream width (m)	Q100 Cross - Sectional Area Calculation (3.0 X Ratio)									
	Average Depth of Stream (m)									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
0.2	0.06	0.12	0.18	0.24	0.30	0.36	0.42	0.48	0.54	0.60
0.3	0.09	0.18	0.27	0.35	0.45	0.54	0.63	0.72	0.81	0.90
0.4	0.12	0.24	0.36	0.48	0.60	0.72	0.84	0.96	1.08	1.20
0.5	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50
0.6	0.18	0.36	0.54	0.72	0.90	1.08	1.26	1.44	1.62	1.80
0.7	0.21	0.42	0.63	0.84	1.05	1.26	1.47	1.68	1.89	2.10
0.8	0.24	0.48	0.72	0.95	1.20	1.44	1.68	1.92	2.16	2.40
0.9	0.27	0.54	0.81	1.08	1.35	1.62	1.89	2.16	2.43	2.70
1.0	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00
1.1	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64	2.97	3.30
1.2	0.36	0.72	1.08	1.44	1.80	2.16	2.52	2.88	3.24	3.60
1.3	0.39	0.78	1.17	1.55	1.95	2.34	2.73	3.12	3.51	3.90
1.4	0.42	0.84	1.26	1.65	2.10	2.52	2.94	3.36	3.78	4.20
1.5	0.45	0.90	1.35	1.80	2.25	2.70	3.15	3.60	4.05	4.50
1.6	0.48	0.96	1.44	1.92	2.40	2.88	3.36	3.84	4.32	4.80
1.7	0.51	1.02	1.53	2.04	2.55	3.06	3.57	4.08	4.59	5.10
1.8	0.54	1.08	1.62	2.15	2.70	3.24	3.78	4.32	4.86	5.40
1.9	0.57	1.14	1.71	2.25	2.85	3.42	3.99	4.56	5.13	5.70
2.0	0.60	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	6.00
2.1	0.63	1.26	1.89	2.52	3.15	3.78	4.41	5.04	5.67	6.30
2.2	0.66	1.32	1.98	2.64	3.30	3.96	4.62	5.28	5.94	6.60
2.3	0.69	1.38	2.07	2.75	3.45	4.14	4.83	5.50	6.15	6.90
2.4	0.72	1.44	2.15	2.88	3.60	4.32	5.04	5.70	6.36	7.20
2.5	0.75	1.50	2.25	3.00	3.75	4.50	5.25	5.94	6.63	7.50
2.6	0.78	1.56	2.34	3.12	3.90	4.68	5.46	6.18	6.96	7.80
2.7	0.81	1.62	2.43	3.24	4.05	4.86	5.67	6.42	7.20	8.10
2.8	0.84	1.68	2.52	3.35	4.20	5.04	5.88	6.60	7.44	8.40
2.9	0.87	1.74	2.61	3.45	4.35	5.22	6.09	6.90	7.74	8.70
3.0	0.90	1.80	2.70	3.60	4.50	5.40	6.30	7.20	8.10	9.00

- Footings or abutments for bridge structures must be placed outside of the top-of-bank of a stream, unless otherwise approved under a Section 9 Approval under the Water Act.

#### Fish Streams

- At crossings supporting fish populations, only open bottomed arches, wooden culverts, embedded culverts, or clear span bridge structures will be used. Any other structure would require Section 11 Approval under the Water Sustainability Act.
- Timing of structure installation will be in accordance with [DFO Standard Fish Timing Windows](#) stipulated by MoE and DFO as well as the applicable [Measures to Avoid Causing Harm to Fish and Fish Habitat](#) as described by the Department of Fisheries and Oceans (DFO). Unless authorized by a Qualified Professional, variances to the standard fish timing windows must have written approval from DFO.
- Where a crossing of a Fish Stream can be constructed without any in-stream impacts (i.e., no fill placed below the high water mark or increase of the foot print of the high water mark), installation timing will not be limited to the standard fish timing windows.
- Consider having an Environmental Monitor on site during installation or major maintenance projects in the following situations:
  - Working outside of fisheries windows
  - Complex or non-routine installations
  - Working in an area noted by the CHN or CHN Fisheries that are fish sensitive

#### Cross-Drain Culverts

- Unless otherwise specified in the Plan or Contract, the minimal cross-drain size will be 400mm (CMP) or 381mm HDPE.
- Skew culverts to road centerline by 3 degrees for each 1 percent that the road exceeds 3 percent to a maximum of 45 degrees. The minimum slope of the culvert is 2%.
- Unless otherwise specified in a contract, cross drains must be installed every 100m on road exceeding 8%.

#### High Density Polyethylene (HDPE) Culverts

- Avoid prescribing HDPE culverts in areas where fine sand or silting material will be used as base bedding and backfill material. A well compact gravel or rocky material (rocks no larger than 8cm) should be available to road crews.
- Prescribed culverts depth must be at least 40 cm; prescribed culvert lengths (where applicable) should be made such that the length of the culvert projecting beyond the road prism embankment is minimized. NOTE: as HDPE culverts are flexible, any length projecting beyond the road prism is susceptible to “bowing upward” (resulting in ditchline water not entering the culvert); prescribed culvert gradients must 2% or less.
- Refer to the Operations SOP for specific installation and maintenance/ inspection instructions regarding the use of HDPE culverts.

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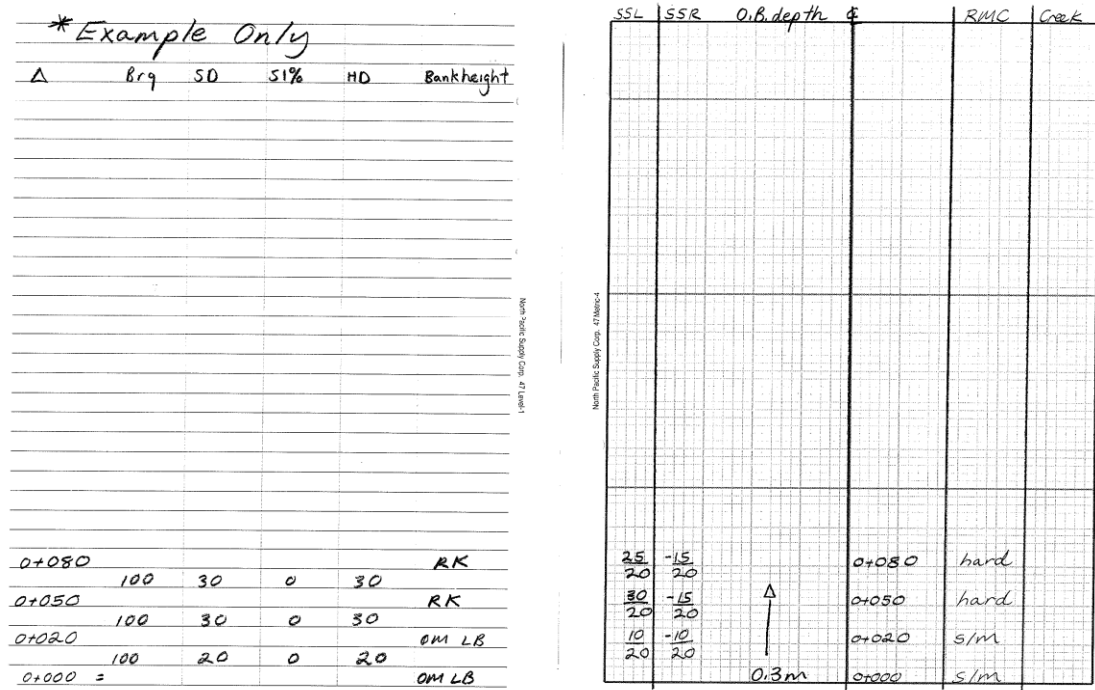


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**Bank Height & Soil Type Guidelines\***

- Unless otherwise noted in the Plan or Contract, the following parameters must be used to meet the requirements for Road Appraisals.
- Determine whether the ground material is OM (other material that does not require drilling or blasting or RK (Rock/Hardpan that requires drilling and blasting). Put either RK or OM in the appropriate column on your field card (or handheld). If the material is OM use local knowledge and surface indicators of the area to estimate the proper OM category. The three OM categories to choose from are:
  1. (LB); ballasted with local material rock or gravel.
  2. (PR); pit run gravel that has to be hauled 100 meters or greater.
  3. (RB); rock ballast that has to be hauled 100 meters or greater.
- Estimate the RMC (Rock Mass Classification) for both OM and RK sections. The categories to determine in the field are soft/medium or hard rock. Basically if the block (rock size) is greater than 6 inches and very hard to fracture after 3 strikes with the back side of a hatchet it is hard rock. Everything else can be categorized as soft/medium. This info can be collected in a separate column on the field card.
- Depth of OB (Overburden) must be estimated and recorded on your field card. Use local knowledge of the area you are working in and pay attention to cut banks on built roads in the general vicinity to gauge an appropriate value for depth of (OB).

Refer to field card sample for what a bank height method traverse should look like (below).



- The appropriate bank height category for the rock (RK) sections will be calculated using the spreadsheet.
- To complete design stage:
  - In the survey map module of Road Eng set up a Ground Types editor template. Use the categories in the table below.

**Table 5 - Bank Height Categories**

Bank Height Categories	Cut Slope(%)	Fill Slope (%)
OB – Overburden	200	66.7
RB – OM Rock Ballast	200	100
PR – OM Pit Run	200	66.7
LB – OM Local Ballast	200	66.7
RK – Rock or Hardpan (drill/ blast required)	400	100

- Enter your material types in the ground column of the survey map module. Enter OB and depth in the layer 1 section. Enter the material type (RK or one of your OM categories) in the layer 2 section. You do not need to enter a depth for layer 2.
- In the location module:
  - Set up your overburden parameters.
  - In the location window click on “edit” select “assign parameters by range”. Once in the parameters window select the “site prep” tab.
  - In the depth from topo section input the greatest OB depth in meters from your traverse.
  - Click on the “outside” tab and select “slope stake” from the drop down list for both left and right side.
  - Make sure you save your file at this point.
  - Now go back to the regular location window.

**In the Location module of Road Eng set your data column as follows.**

P- Stn m.	Ss l %	Ss r %	Cut V. Cu. m.	Fill V. Cu. m.	Mass H. Cu. m.	Cut Dp. m.	Lyr1 Dp. m.	Lyr2 Dp. m.	Stk L Y m.	Stk R Y m.	Lyr 2 Gnd.
0	18	-10	0	0	0	0.8	0.5	0	1.9	0	RB
0	18	-10	264.2	0	0	0.8	0.5	0	1.9	0	RB
22.3	21	-16	113.5	0	264.2	0.9	0.5	0	2.3	0	RB
31.6	21	-16	14.9	0	377.7	1.1	0.5	0	2.4	0	RK
32.7	21	-16	176.1	0	392.6	1.1	0.5	0	2.4	0	RK
45	26	-16	313.8	0	568.7	1.3	0.5	0	3	0	RK

- It is critical to have these column headers in the proper order to allow the data to be exported in the spreadsheet correctly.
- Copy the data window screen and paste it into the spreadsheet. The spreadsheet formulas will calculate the correct bank height category. Make sure cell A3 is highlighted in the spreadsheet so it pastes in the right spot!! Double check that your column headers are the same as the spreadsheet.

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**Example of data window imported into bank height spreadsheet.**

P-Stn m.	Ssl %	Ssr %	Cut V. Cu. m.	Fill V. Cu. m.	Mass H. Cu. m.	Cut Dp. m.	Lyr1 Dp. m.	Lyr2 Dp. m.	Stk L Y m.	Stk R Y m.	Lyr 2 Gnd.	Bank Height m.	Surfacing D. m.	Bank Height Cat.	RMC Cat.
0	18	-10	0	0	0	0.8	0.5	0	2.1	0	RB	1.1	0.5	RB	s/m
0	18	-10	319	0	0	0.8	0.5	0	2.1	0	RB	1.1	0.5	RB	s/m
22.3	21	-16	135.8	0	319	0.9	0.5	0	2.5	0	RB	1.5	0.5	RB	s/m
31.6	21	-16	17.7	0	454.8	1.1	0.5	0	2.6	0	RK	1.6	0.5	MRK	s/m
32.7	21	-16	209.8	0	472.5	1.1	0.5	0	2.6	0	RK	1.6	0.5	MRK	s/m
45	26	-16	374.7	0	882.3	1.3	0.5	0	3.3	0	RK	2.3	0.5	MRK	s/m
69.5	15	-24	125.1	0	1057	0.8	0.5	0	1.9	0	RB	0.9	0.5	RB	s/m
79.5	15	-24	264.5	0	1182	1	0.5	0	2	0	RK	1	0.5	TOE	s/m
95.8	18	-26	429.4	0	1446.5	1.6	0.5	0	3	0	RK	2	0.5	MRK	s/m
122.1	0	-24	58.4	0	1875.9	1.1	0.5	0	1.4	0	RB	0.4	0.5	RB	s/m
127.4	0	-24	379.1	0	1934.3	1.1	0.5	0	1.3	0	RK	0.3	0.5	TOE	s/m
150.3	30	-25	493	0	2313.3	1.4	0.5	0	3.8	0	RK	2.8	0.5	MRK	s/m
174.1	8	-28	196.1	0	2806.3	1.7	0.5	0	2.3	0	RB	1.3	0.5	RB	s/m
183.4	8	-28	353.8	0	3002.4	2	0.5	0	2.5	0	RB	1.5	0.5	RB	s/m
200.1	30	-25	27.3	0	3356.2	1.2	0.5	0	3.5	0	RK	2.5	0.5	MRK	s/m
201.5	30	-25	255.2	0	3383.6	1.2	0.5	0	3.5	0	RK	2.5	0.5	MRK	s/m
211.7	30	-25	292.5	0	3638.8	1.9	0.5	0	4.4	0	RK	3.4	0.5	HRK	s/m
222.3	30	-25	597.2	0.3	3931.3	1.9	0.5	0	4.3	0	RK	3.3	0.5	HRK	s/m
243.8	37	-30	157.8	0.2	4528.2	1.1	0.5	0	4	-0.3	RK	3	0.5	MRK	s/m
250.4	40	-25	275.2	0	4685.8	1.6	0.5	0	4.8	0	RK	3.8	0.5	HRK	s/m
259.3	40	-25	611.1	0	4961	2.1	0.5	0	5.6	0	RK	4.6	0.5	XRK	s/m
287.8	16	-15	134.3	0	5572.1	0.8	0.5	0	1.9	0	RB	0.9	0.5	RB	s/m
298.3	16	-15	0	0	5706.5	0.9	0.5	0	2	0	RB	1	0.5	RB	s/m
298.3	16	-15	0	0	5706.5	0.9	0.5	0	2	0	RB	1	0.5	RB	s/m

- Note the appropriate bank height category appears in the Bank Height category column.
- The only data that has to be manually entered into the spreadsheet is the surfacing depth and RMC type.

For reference rock type categories are noted in the spreadsheet.

- Spreadsheet Methodology Explanation:
  - Look in row 1, the ground type reads RB. OM categories are not defined by the height of the cut. RB defaults into the Bank height Category column.
  - Look down to the 4th row, the ground type reads RK. The spreadsheet recognizes that this ground type is defined by the height of the cut. The spreadsheet then calculates bank height category which in this case is MRK (Medium Rock Face Height 1.51 to 3.00m).
  - To calculate the proper bank height category the formula deducts the height of Surfacing Depth from Stk L Y or Stk R Y column.
  - Stk. LY and Stk. RY is the vertical distance from the top of the cut to the subgrade depth minus the overburden depth. The greatest positive value between these two columns is used in the formula.
- Reference Points (RPs) must be established at the following locations:
  - Road junctions
  - Landings
  - Major culverts (field located only)
  - Minimum 200m spacing
- Each RP will contain the following information:
  - Road Name
  - Road Station
  - Stream Number (where applicable)

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### Road Layout and Design Packages

A road package contains the information necessary for a road builder to construct a road to a prescribed standard while maintaining compliance with applicable legislation, minimizing environmental impact and providing for a safe and functional road for future users. An associated "road layout and design" is signed and sealed by a qualified forest professional and submitted to government for approval.

Table 6: Road Layout & Design Package requirements

Description	Detailed Requirements
Road Instructions Map	- See Road Instruction Map requirements below.
Road Profiles	- For all roads - Show topography, finished grade line (with % grade), culverts and cross drains, ground types/layers, side slopes and Mass Haul - Typically 20m horizontal and 2m vertical scale
Road Cross Sections	- For all roads where a side slope exceeds 20% - Typically 1:200 scale - At every traverse and culvert station - Must show soil depth estimate - Must show road prism capping - Construction category 1 – 2 use 1 horizontal 2 vertical cut bank ratio - Construction category 3 – 6 use 1 horizontal 4 vertical cut bank ratio unless otherwise specified by a Terrain Specialist
Plan View	- Switchbacks with >15% favourable grade or > -5% adverse and/or > 2m cut - Critical curves (e.g., for crossing alignment) - Show with stations or hubs, curve radius, BC/EC stations at 1:500 or similar scale
Professional Design/ Drawings	- Major culverts - Bridges - Constructed Fills - Armoured Fords - Additional information may be included as deemed necessary by the operation or at the request of the road builder. Examples may include a copy of road permit approval letter or supporting "text", "instructions" or summary tables.
Steep Grades Rationale	- Ensure road grades meet those highlighted in the Forest Road Engineering Guidebook 2002 (refer to table 2 (page 27) for road grade specifications). Road grades should not exceed 18% unless no other option exists. If it is necessary to exceed 18% for short pitches (<150m) this should be brought to Taan Forest's attention and a rationale will need to be submitted. Taan Forest may request the road be re-engineered/re-designed to lessen the grade. In the event it is necessary to exceed 18% for a distance greater than 150m, rationale is required and a detailed risk/ hazard assessment will need to be completed (OH&S regulations).

### Post Layout

- Completion of the Taan Post Layout Checklist indicates to Taan Planning that the block is complete. Any outstanding items must be completed or clarified.
- The post layout checklist serves as the Contractor's final check to ensure all layout requirements are met. This also serves as the "Crew Report".
- Post Layout Checklist is to be signed by the individual completing and the Supervising RPF/RFT and filed with the associated block folder. All related assessments must also be signed by the individual completing and the Supervising RPF/RFT.

- Taan Engineering Supervisors will review final packages for thoroughness and completeness. Once packages are approved by Taan Engineering Supervisors, the block is ready for permit preparation and submission.

## **Data Submissions**

- Geodatabase (Geodb) information collected over the development of the block will be submitted to the CHN and Province at the RP Application and again at the CP Application stage. GeoDB updates will be submitted with depletion updates the November after harvesting has commenced.

## **Cutting Authority Permits**

- Cutting Permits are not submitted to MFLNRO unless a Site Plan has been completed and signed/ sealed by an RPF. For upcoming cedar areas, notify any Haida Representatives that have expressed an interest in bark collection at the time of submission of the permit applications to permit collection of bark prior to harvesting. Typically, bark collection is desired in the spring/ summer months.
- Refer to Appendix 3 for detailed Permit Submission procedures.

## **Road Inspection Procedures**

- These interim Road Inspection Procedures will be used until full procedures are developed. These interim procedures do not supersede the inspection procedures used by Planning when re-activating a road for a block's development (as stated above).
- This procedure will outline when to conduct a road inspection, who conducts road inspections, how to conduct the inspection, how to record the inspection and how to track any actions required from the inspection.
- All roads under Road Permit and those that have an environmental issue noted (even if not under permit) are to be inspected.

### **Timing**

- All haul roads and primary road systems (Main Lines) used by the public are to be inspected annually and are covered by the Planning SOP re-activation procedures. Additionally, annual bridge inspections are also conducted on main lines and haul roads.
- Secondary and tertiary roads under Road Permit that are not used as haul roads or public access roads are expected to be inspected every three years.
- While a formal inspection is not scheduled for individual roads this road inspection procedure is intended to cover all secondary and tertiary non-haul roads through general day to day travel to and from the work site. The intent is to have all roads travelled within three years. All roads should be reviewed while traveling to and from the work site.



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### Conducting the Inspection

- Road inspections are to be conducted by all Planning Contractors, Taan Planning and Operational employees that travel the road systems for work on a regular basis and/or have a general understanding of road conditions for safety and environmental impacts.
- A General overview of the road will be conducted during normal travel on the road (driving, walking to a block, quading, etc.). The inspector should be watching for road problems relating to Safety and the Environment. Inspection of individual culverts, crossings and other road features is not required unless a problem is noted.
- Some issues or problems the inspector may find:
  - Tension cracks
  - Slides, slumps and rocks
  - Damaged bridges
  - Wash outs
  - Downed trees
  - Failed or plugged culverts
  - Missing signage
  - Impassible road

The inspector should keep in mind priorities for determining action plans:

<b>High Priority</b>	Public/ worker danger or environmental damage could occur at any time
<b>Moderate Priority</b>	Road safety is a general concern but unlikely to be traveled by the public and/ or environmental damage is possible however no evident damage has occurred to date
<b>Low Priority</b>	No safety hazard or very low likelihood of an incident and/ or environmental damage, possible but unlikely – i.e., possible action if a machine is nearby

- Any issues or problems found should be documented by taking a picture of the issue/ problem and recording the road name and general issue with the road.

### Recording the Inspection

- When back at the office mark on the Road Inspection Wall Maps what roads you were on. Highlight the road(s) in yellow. If there was a problem with the road mark the road or section of road it in red on the map.
- Roads without any issues are dated on map and initialed by inspector.

### Tracking Problem Roads

- Roads with issues have an action plan created. Record and plan an action on the associated Road Inspection Form. Assign responsibility to the action and ensure the person you assigned the responsibility to is aware of the issue.
- If machinery is planned to go to a problem road, there is a good chance the road will be further reviewed for deactivation, in order to remove it from Road Permit.
- Monthly the Road Inspection form has all actions recorded in the Action tracker by Taan's Admin Assistant.

## Forestry Planning Procedures

### Site Plans

- Prior to conducting field work, consider reviewing the following documents or items:
  - Ministry or licensee contract specifications
  - Draft Land Use Order
  - Forest Stewardship Plan (FSP)
  - Forest Nations agreements or concerns
  - Public comments
  - Terrain stability classification mapping
  - Recreation and visual objectives
  - Biodiversity and wildlife issues
  - Planning checklist (or equivalent)
- Ensure a Planning Checklist, or equivalent (refer to appendices) is on file. At the prescribing forester's discretion, a Checklist must be completed prior to Site Plan field work. Site plan field work should occur during the layout stages of block development where the Signing Forester or their designate is part of the layout crew. Otherwise Site Plan Field work should be conducted by the Signing Forester or designate after the layout is complete.
- The Site Plan will be the final field check to ensure all Taan planning processes were followed (including SOPs), assessments completed and layout finalized. The Site Plan cross references the Taan Forest Stewardship Plan, Haida Gwaii Land Use Order, Legislation, FSC Management Plan and Professional Reliance.
- The Taan Site Plan Template and Site Plan Checklist is to be completed for each area. Ensure that the method to obtain tree height is documented within the Site Plan.
- Multiple blocks may be included in one Site Plan depending on the comfort level of the signing Forester. Multiple blocks in one site plans all should have the harvest completion date scheduled for the same year to ensure silviculture obligations have the same timing.
- Site Plans must include a description of the stand structure (including occurrence of live wildlife trees and snags and relative amounts of coarse woody debris), riparian features, rare ecosystems features and/ or other critical habitats identified and basic ecosystem and soil information for both the proposed harvest area as well as internal and external retention patches.
- In the event that growth and yield or other research plots are identified within or adjacent to proposed cutblocks, refer to the Taan PSP inventory to determine the significance of the plot. All MFLNRO established Growth and Yield Plots must be maintained and any Growth and Yield Plots with Cedar must be maintained. M&B plots of white wood can be harvested. If information is not determined on any other established research plot, consult with MFLNRO representatives regarding management strategies to protect the feature (e.g., typically a 100m buffer is considered).
- Calculations done to support the Site Plan development e.g., cedar retention and regeneration) must be clearly documented and retained on file.
- A peer review is required to be completed by a professional forester and/or a lead engineer involved in the layout harvest area. The final Site Plan will be forwarded to the Taan Planning Supervisor for review.
- Site Plans will also include a silviculture regime / instructions for Taan's Planning Forester to follow and schedule silviculture activities.

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- Where seed trees or advanced regeneration is utilized, ensure leave trees are selected to maintain species and genetic diversity.
- Where silviculture and/ or stand management prescriptions prescribe treatments that vary from 'typical' silviculture treatments, the planner must ensure they are consistent with the Range of Natural Variation (refer to the FSC MP).
- A copy of the final signed and sealed Site Plan (with map) and silviculture regime/ instructions (with map) must be retained within the Block File
- Final Site Plan and Silviculture Regime will be filed on [Taan Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Forestry/Site Plan and /Treatment Regime](#) or [Shared/Public Engineering/Contractors/Forestry](#).
- During Site Plan Development the Harvest and Road Instructions should be developed. This is to ensure consistency in prescription between each plan. Use the Taan Harvest Instructions and Harvest instructions Template.

### **Windthrow Monitoring Assessments**

- Taan has developed a Windthrow Effectiveness Monitoring Program within the Corporate Management System (Planning SOP) that utilizes a CMS Monitoring Form that collects information for each cutblock at the following stages:
  - Post-Harvest Assessment (within 3-6 months of harvest);
  - Survival Walkthrough (typically 1-2 yrs post-harvest); and
  - Stocking Survey (typically 3-6 yrs post-harvest).
- Results will be compiled and assessed for overall effectiveness evaluation during the compilation of the annual FSC Monitoring Report.

### **Post -Harvest Assessments**

- A Taan representative may conduct Post Harvest Assessment on cutblocks where harvesting has been completed to assess the following (assessment is documented using notes to file or checklist format, where it exists):
  - PAS / ABR
  - Soil Disturbance levels within limits
  - Plantability (and whether site preparation is required)
  - Windthrow levels
- Where site preparation, creek cleaning or deactivation is required, create an action plan/ prescription to instruct activities and ensure control measures are in place for sedimentation.

### **Soil Rehabilitation Planning Procedures**

- Temporary access structures and unplanned soil disturbance in excess of permitted levels based on soil sensitivity (refer to the Site Plan) must be rehabilitated within five years of disturbance.
- Where permanent access levels are significantly higher than the 7% limit, consider rehabilitation of roads not required for future access.

### **Creek Cleaning Planning Procedures**

- All woody debris removed from the creek must be placed 5 m from the high water mark to avoid reintroduction into the creek.
- Scatter woody debris to make plantable spots.
- For mechanical creek cleaning, refer also to the Operations SOP.

### Site Preparation Planning Procedures

- For Mechanical Site Preparation with ground based machinery, refer to the Operations SOP.
- Ensure the method of mechanical site preparation takes into consideration and balances the effectiveness of achieving management objectives while minimizing negative environmental impacts (e.g., soil degradation).
- Where regeneration and fire hazard are not significant concerns, avoid piling and burning within cutblocks or along roadsides or at landings in order to maintain coarse woody debris, particularly in second growth blocks.

### Fuel Hazard Assessments and Abatement Procedures

- Fuel hazard assessments are required to ensure that fire hazards created or increased by the harvest activities are identified. As a result of the assessment, the development of a fuel hazard abatement strategy may be required to reduce the fire hazard risk to an acceptable level.
- Assessments can be completed by Taan Staff and Contractors. Abatement strategies must be developed or reviewed by a Forest Professional (e.g., RPF or RFT).

#### Assessments

- A high level analysis is completed on an annual basis to determine if blocks will require a site level fuel hazard assessment. The analysis includes all blocks planned for harvesting during the upcoming fire season and ones that are harvested and are not declared “regenerated”.
- The analysis is completed using the following methodology:
  1. A spatial review is completed by Planning using the “British Columbia Fire Risk Map”. Any blocks listed as high or severe require a site level fuel hazard assessment.
  2. Blocks are further evaluated based on the species composition of the harvest area (cedar component) and the ease of public access (refer to Table 7). Any blocks determined in the matrix to be moderate or high require a site level fuel hazard assessment.

Table 7: Fire Hazard Risk Matrix

Cedar Composition	Public Access		
	<200m of Highway or Mainline	Other roads(flat and smooth)	Roads with difficult access (or deactivated)
> 40%	HIGH	MODERATE	LOW
< 40%	MODERATE	LOW	LOW

- Appendix 4 lists the results of the annual analysis. Where a site level fuel hazard assessment is required (risk map results in high/ severe or risk matrix results in moderate/ high) page 2 of the CMS Post-Harvest Checklist must be completed.

#### Abatement

- Where the fuel hazard assessment indicates that abatement is required, the following hazard abatement strategies are acceptable to Taan in combination or individually:
  - Burning road side piles and or in-block piles.
  - Non-Abatement options include but are not limited to: limiting public access (e.g., gating or deactivating road) or dispersing vertical and elevated fuels. These options must be reviewed by a Forest Professional.







## Field Marking Standards

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Harvesting & Road Construction		
Item	Ribbon Color	Additional Marking
Falling Boundary (R/W, RRZ, WTRA, Yew Patch, etc.)	<b>FALLING BOUNDARY</b>	Falling Corners every 100m, at significant changes in direction and where roads/ streams enter/ exit block Boundary marked with <b>orange paint</b> . FC consecutive numbers, permanent marker with block # and FC # Retention trees marked with 3 dots at breast height and 1 dot at stump (orange paint)
Management Zone (Special, RMZ, Yew Patch)		
Road Centerline (CL)/ Landing location on CL	<b>ROAD LOCATION or CENTER LINE</b>	<b>Pink paint</b> on Hub or Station and Reference Points Roads "station, chainage, and road name" hand written on ribbon. "Landing" hand written on ribbon Culverts marked with "chainage station, culvert size and length and stream ID" on ribbon
Road Recce		
Hoe Trail	<b>CENTER LINE</b>	
Deflection Lines/ Baseline		
Non-Fish Stream Centerline		
Fish Stream Centerline		
Machine Free Zone	<b>MACHINE FREE ZONE</b>	
Traverse Station		
Individual Yew Tree		Individual trees marked outside of reserve or management zone patches.
CFI Feature, Culturally Modified Tree, Monumental Cedar	<b>CMT, CHN or MONUMENTAL</b>	<u>CFI Yellow flagging is not pre-printed with text, but often marked with felt pen.</u> <u>Monumental Cedar:</u> - Each tree must be marked with the monumental tree number and diameter using orange paint, marked at DBH - Write the MT number and DBH on the flagging - Trees that were reviewed for MT's and were discovered not to be MTs should be marked with an 'X' at DBH to show they were reviewed - if the tree falls within the block and planned for harvest in addition to paint, attach an aluminum tag to the tree (using aluminum nail) below the point of germination, preferably between the roots or root flares as close to the North side of the tree as possible. Write the block number and monumental tree number on the tag



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Item	Ribbon Color	Additional Marking
Timber Cruise Strip Lines		Plot centers marked with Blue & White Ribbon and Metal Tag or blazed reference tree
Timber Cruise Plot Center		
Treatment Area Boundary		
Safety Hazard	<b>NO WORK ZONE</b>	
<b>Forestry/ Silviculture</b>		
Item	Ribbon Color	Additional Marking
Silviculture Surveys & Quality Plots		Plot Centers and start of strip lines
Planting, Site Prep, Fertilization, Spacing or Pruning Boundary		
<b>Road Maintenance, Deactivation and Rehabilitation</b>		
Item	Ribbon Color	Additional Marking
Clean Ditchline Section		<b>Paint pink</b> line at the ditchline and mark arrows indicating direction to clean. Use pink glo ribbon to mark section to clean at POC and POT.
Clean, Remove or Install Culvert	<b>CULVERT</b>	Supplemented with hand written instructions
Install Cross Ditch / Install Waterbar	<b>CROSS DITCH</b>	Refer to map to distinguish between waterbar and cross ditch
Sidecast Pull-Back	<b>PULL BACK</b>	Mark ribbon with start and end stations
<b>Miscellaneous</b>		
Item	Ribbon Color	Additional Marking
Tenure Lines	<b>LEGAL BOUNDARY</b>	Single blaze or tag (white) at breast height, inter visable along boundaries. Mark corner posts with tenure #
Access Trails (i.e., safe access routes, etc.)	<b>TRAIL</b>	Marked on issue map as required.
Helicopter Harvesting – ‘Take’ Log	-	<b>PINK paint</b> for Quality Control purposes after Falling activities occur.
Helicopter Harvesting – ‘Leave’ Log	-	<b>BLUE paint</b> for Quality Control purposes after Falling activities occur.

- Unless otherwise specified in the plan or contract, field marking standards above are to be used (intended to be consistent with BCTS requirements). Salvage operations may be exempt from full field marking requirements, with written approval from the Salvage Coordinator.
- Layout must be completed to the specifications of the plan or contract. During layout, specific attention must be paid to the following contract or plan items:
  - Machine or equipment specifications (yarder height, yarding distance and deflection)
  - Road design parameters (running surface, minimum and maximum grades and switch back radii)
- Flags or markings are to be located at intervals that are clearly visible; winter weight is to be used.
- Ribbons must be facing inside the block; Falling corners must be clearly identifiable and consecutively numbered; and Falling line is the “harvest area” – not necessarily back lines.

## GPS Survey Standards

- Field traverses are required to be completed using a Global Positioning system (GPS). GPS units with the capability of being adjusted to meet RIC (Resources Inventory Committee) standards (i.e., Trimble or Lieca) are to be used.
- Surveys completed using a GPS must meet the "British Columbia Standards, Specifications and Guidelines for Resource Surveys Using Global Positioning System (GPS) Technology" [http://www.for.gov.bc.ca/dkm/ESF\\_Info/GPS\\_Standards\\_Resource\\_Surveys.pdf](http://www.for.gov.bc.ca/dkm/ESF_Info/GPS_Standards_Resource_Surveys.pdf).
- For Boundary traverses use either Dynamic or Static Collection:
  - Dynamic – preferred method
    - POC & POT are considered highly significant points - collect the lesser of 150 epochs or 3:00 min epoch collection at 1 second intervals.
    - POC's and POT's include the beginning and end of spur roads and beginning and end of traverses.
    - Falling Corners and key points/ features along the dynamic line (e.g., LUO features, stream boundary crossings, road/ boundary crossings) are considered standard points with line reference - collect at least 50 epochs at 1 second intervals.
    - Between highly significant and standard points collect epochs using a Dynamic line feature collecting one epoch every 1 second. No more than 10m should be travelled without an epoch collected
  - Static – To be used where a Dynamic function is not operable
    - All Falling Corners, POC's and POT's of roads/ streams etc are considered highly significant points as there is no reference (line) to tie the point to - collect the lesser of 150 epochs or 3:00 min epoch collection at 1 second intervals.
    - Between highly significant points collect standard points every 20m minimum. More standard points will be needed where there is more deflection in the line being traversed. Collect at least 60 epochs at 1 second intervals for every standard point.
    - Standard points and significant points must be joined within the GPS data using a "connect point" feature on the unit. Raw data being viewed must be a continuous line
- Hand Traverses are to be used where a GPS Dynamic or Static traverse cannot be conducted.
- Traversing new roads by GPS is used for spatial location of the road only. At no time area GPS points along the road to be used within Road eng for the road design. Hand traversing is the only acceptable road traverse for new roads and their design
- To combine hand traverse (i.e., conventional) and GPS traverses the cruise manual must be followed: <http://www.for.gov.bc.ca/ftp/hva/external/!publish/Web/Manuals/Cruising/chapters/CH3.pdf>.
- Hand Traverses must start at the last known Falling Corner collected by GPS and must overlap the Dynamic traverse or Static traverse by a minimum of 50 m. All efforts must be made to make the last known Falling Corner collected by GPS a POT (150 epochs)
- If starting the GPS up again from the hand traverse the GPS traverse must start at the last established Falling Corner and collected as a POC or Highly Significant Point (150 epochs). The Dynamic or Static traverse must overlap the hand traverse by a minimum of 50m.

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## Mapping Standards

- For detailed mapping standards, refer to the Silvacare Inc. Taan Mapping SOP document (available on the public drive). The Mapping SOP document is updated fairly frequently, so be sure to check the public drive periodically for the most current version.
- All mapping will use the Taan Base Map, Geodb's and templates located on the Taan File Server.
- The Taan Base Map will be updated concurrently with new data from field verification during layout. The Taan Base map should be downloaded by multiphase contractors bi-annually to ensure the most current version is used. Notify Joni when a new version has been uploaded.
- At all times efficiencies in mapping should be employed and digital versions of mapping versus hard copies should be utilized in the field.
- All maps must include pertinent safety hazards and risks that are identified within the block out adjacent (e.g., steep slopes, gullies, unstable cuts, rock-fall, sink holes/ karsts, snags, mining shafts, avalanche/ landslide, etc.).
- Several maps are expected to be created during the various phases of block development, preferably all in digital format:
 

<ul style="list-style-type: none"> <li>1) Recce Map</li> <li>2) Field Map</li> <li>3) Cruise Plan Map</li> <li>4) Cultural Feature ID Map</li> <li>5) Information Map</li> <li>6) Cruise Map</li> </ul>	<ul style="list-style-type: none"> <li>7) Appraisal Map &amp; Overview Map (Exhibit 'A')</li> <li>8) Road Permit Map</li> <li>9) Site Plan Map (Cutblock &amp; Road)</li> <li>10) Road Instruction Map</li> <li>11) Road Reactivation Map</li> <li>12) Harvest Instruction Map</li> <li>13) Assessment Maps (e.g., windthrow, forest influence, etc.)</li> </ul>
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### Recce Map

- Recce maps may include a high level 'coarse filter' overview map used to guide field recce activities and determine potential boundary locations, field maps, as well as the final Recce Map showing the required content (below) and associated with the submitted spatial data (shape files).
- Recce Maps will be used by Taan to confirm the block location in relation to LUO Objectives and Taan Planning objectives.
- Multiphase contractors will provide Taan with shape file and GPS traverse data of recce'd block shape & roads. Shape files can be created by GPS traverse or Digital Hand Drawn estimate with geo reference.
- Taan will overlay the shape to determine if the block development will proceed.
- Shape file and GPS traverse data of recce'd block shape & roads are filed [Taan Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics/Data/Recce](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures. Maps are filed under Geomatics.

### **Field Maps**

- Field Maps are created and used at the contractor's discretion - for internal use only by field personnel requiring field maps prior to operational mapping being complete (e.g., contractor employees, assessment crews, etc.)
- Store Field maps under: **Taan**  
[Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics/Field Map](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures

### **Cruise Plan Map**

- Cruise Plan Maps are created after the layout and traverse of the block boundary and roads. Cruise Plan Maps will be the first data check by mappers to ensure proper block location and shape.
- Cruise Plan Maps are placed directly under **Taan**  
[Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures.

### **Cultural Features Identification (CFI) Survey Map**

- CFI Maps are created using the templates required by the Council of the Haida Nation as part of their survey process. CFI Maps are created by the contractor and their CFI surveyor.
- CFI maps must follow Taan mapping formats as closely as possible.
- Final CFI Maps are placed directly under **Taan**  
[Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Assessments/CFI & Arch](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures.

### **Information Map**

- The Information Map is used for review and discussion purposes with the Council of Haida Nation and the Heritage Resource Committee. The Information Map is submitted in conjunction with, or prior to, the Permitting processes.
- Information Maps are placed directly under **Taan**  
[Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures.
- Related data must also be appropriately filed:
  - GPS corrected and uncorrected data
  - Roadeng data
  - CFI report
  - Assessment data (Riparian, Wind-firming)
  - Appraisal Data Sheets
  - Draft Road design
  - Draft Road Instructions
  - Draft Harvest Instructions

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**LUO Relocation Map**

- A due diligence LUO Relocation Map should also be prepared simultaneous with the Information Map.

**Cruise Map**

- The Cruise Map (final) will include cruise plots (identify cruised vs. Out), cruise strip-lines (directional strip lines and tie lines) and cruise area summary with timber type.
- Filing required for Cruise Maps are placed directly under [Taan Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures:

**Appraisal Map (Exhibit ‘A’)**

- The Appraisal Map (Exhibit ‘A’) will be created from the base of the Information Map, and is a combination of the Harvest Instruction Map, the Road Instruction Map and the Road Reactivation Map.
- An Overview Map is also required to be completed to accompany the Appraisal Map.
- Appraisal Maps (Exhibit ‘A’) are placed directly under [Taan Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures.
- Supporting data/ info must also be appropriately filed:
  - Outstanding assessments
  - Permanent Access Structure Calculations and Road width
  - Final Road design
  - Final Road Instructions
  - Final Harvest Instructions

**Road Permit Map**

- Where required.
- Road Permit Maps are placed directly under [Taan Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures.

**Site Plan Map (Cutblock & Road)**

- Cutblock Site Plan – if all roads are being built within the development area. Cutblock and Road Site Plan – only if there is road being built outside the development area.
- The Site Plan Map will be used for the Silviculture Obligations of the regenerating stand after harvest completion.
- Site Plan Maps are placed directly under [Taan Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures.



### **Road Instruction Map**

- Where end haul is planned, ensure that the Road Instructions contain specific instructions to meet the OH&S requirements under section 20.78-1a. Where the terrain assessment indicates any specific instructions regarding conceptual ¾ and full bench construction design, ensure they are included in the instructions.
- Ensure that information related to any Monumental Cedar to be harvested as part of the HG Cultural Wood Access Program is clearly indicated on the map and correctly matches the identified monumentals in the field.
- Road Instruction Maps are placed directly under **Taan** [Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures. Final map contains the instructions on the back page.
- Road Instruction map text (back of map) is filed under **Taan** [Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Engineering/General](#) or [Shared/Public Engineering/Contactor/Cutblock ID](#).

### **Road Reactivation Map**

- Road Reactivation Map includes road reactivation culvert and reconstruction table.
- Ensure that information related to any Monumental Cedar to be harvested as part of the HG Cultural Wood Access Program is clearly indicated on the map and correctly matches the identified monumentals in the field.
- Road Reactivation Maps are placed directly under **Taan** [Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures. Final map contains the instructions on the back page.
- Road Reactivation map text (back of map) is filed under **Taan** [Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Engineering/General](#) or [Shared/Public Engineering/Contactor/Cutblock ID](#)

### **Harvest Instruction Map**

- Ensure that information related to any Monumental Cedar to be harvested as part of the HG Cultural Wood Access Program is clearly indicated on the map and correctly matches the identified monumentals in the field.
- Harvest Instruction Maps are placed directly under **Taan** [Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Geomatics](#) or [Shared/Public Engineering/Contactor/Cutblock ID/Geomatics](#) and named per the Taan File Naming Convention procedures. Final map contains the instructions on the back page.
- Harvest Instruction map text (back of map) is filed under **Taan** [Server://Shared/Planning/Tenure/TenureID/Cutblock/CutblockID/Engineering/General](#) or [Shared/Public Engineering/Contactor/Cutblock ID](#)

## **Filing Standards**

- Do not use the Microsoft Outlook message format .msg files. Please convert email files to .pdf when saving.
- Ensure that all obsolete or old versions of files are marked appropriately and moved to the designated archive folder. Only the current versions of plans and maps should be in the main folder, all drafts and out of date versions must be appropriately identified and archived.
- Taan personnel may clean out Archive folders, as appropriate.

## **File Naming Conventions**

- All correspondence related items will be named with the numerical date, followed hyphen, followed by a description of the correspondence (e.g., 20110630-AWUN001 Email Approval Joint Solutions Table).
- All other files will be named with the applicable Cutblock, Road, Cutting Permit or Road Permit ID or project, 'hyphen', and appropriate name of the file, 'hyphen', followed by the numerical date (yyyymmdd), (e.g., JUN005-Harvest Instruction Map-20110630.pdf).
- Where applicable, ensure that "draft" files are identified with "Draft" following the file names above (separated by hyphen from the standard file name). E.g., JUN005-Harvest Instruction Map-20110630-Draft.pdf
- .mxd should be named according to block name and type of map (i.e. GLD001 Harvest Instruction Map.mxd, GLD001 Site Plan Map.mxd and GLD001 Road Instruction Map.mxd). .mxd files must not include a date.

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*Planning  
Supplemental  
Procedures:  
Migratory Birds*



*From the Land and Spirit of the Haida*

## Table of Contents

<a href="#"><u>Introduction</u></a> .....	<i>Error! Bookmark not defined.</i>
<a href="#"><u>Objective</u></a> .....	<i>J-52</i>
<a href="#"><u>Scope</u></a> .....	<i>J-52</i>
<a href="#"><u>Planning</u></a> .....	<i>J-53</i>
<a href="#"><u>Training</u></a> .....	<i>J-53</i>
<a href="#"><u>Field – pre-harvest</u></a> .....	<i>J-53</i>
<a href="#"><u>Falling and Harvesting Operations</u></a> .....	<i>J-53</i>

# **Introduction**

## **Objective**

The following *Operations Supplemental Procedures* is developed specifically for Taan Forest LP and its Contractors

The objective of these Procedures are to:

Provide written guidance to employees and contractors for the identification and procedures to follow when a migratory bird or nest of a migratory bird is encountered

Minimize incidental take which can be defined as: When birds, their nests, or eggs are destroyed during activities like logging, road-building or brushing that do not intend to destroy birds or nests, it is called 'incidental take'.

Identify migratory birds and their nests to plan according to avoid harming them.

Plan activities accordingly to avoid harming migratory birds.

## **Scope**

These procedures apply to all Taan operational activities including the following:

Planning

Road Construction

Falling

Health and Safety are the first priorities. Under no circumstances are these procedures to replace, or come before Taan Forest's Health and Safety Policy or Standard Operating Procedures. These Procedures apply to all Taan Forest personnel, including employees, consultants and contractors working within Taan Forest Tenures



# ***Planning***

## ***Training***

Taan will train staff and logging contractors in bird and active nest identification. Indication of an active nest include but are not limited to:

- Seeing a nest with eggs
- Birds flying up or out just in front of you
- Birds swooping at you or attacking you
- Birds dropping down in front of you without flapping their wings
- Cheeping coming from tree cavities or trees or shrubs
- Birds flying into tree cavities.

## ***Field – pre-harvest***

Taan's engineering and field staff shall attempt to identify migratory birds and their nest during cut block development

Should an active nest be identified the nest area should be placed within stand level retention

During forestry development work, identify areas or features that may support or have a high likelihood of having nesting bird activity. Include identified areas and features in internal or external retention. These areas may include, but are not limited to:

- Riparian areas including wetland and wetland complexes,
- Large snags,
- Deciduous leading areas or individual trees.

## ***Falling and Harvesting Operations***

Taan's logging contractors shall attempt to identify migratory birds and their nest during harvesting operations.

If a nest is identified during harvesting operations, then a no-work zone of 1 tree length should be placed around the nest until the nest becomes unoccupied

# Taan Forest Hydrological Recovery Calculation Procedures (Upland Stream Sub-Units, Sensitive Watersheds & FSC Watersheds)

## Overview

The Haida Gwaii Land Use Objectives Order (HGLUOO) utilizes hydrological recovery targets to meet objectives set in the HGLUOO for Sub-Unit harvest levels and Sensitive Watershed harvest levels. Taan also uses hydrological recovery targets to meet FSC® standards for watershed management.

Hydrological recovery is the ability of a landscape to “handle water”. An undisturbed landscape has 100% recovery. The forests, swamps, water-courses, alpine tundra and all natural occurring non-productive land contribute to the landscape’s ability to manage water. Natural disturbances to a forest (wind, fire) and human-made disturbances (harvesting, urban and rural developments) negatively affect hydrological recovery. When forests are depleted hydrological recovery (ability to handle water) for that stand of forests is generally assumed to be “zero”. As the stand develops, it’s ability to handle water increases.

A qualified hydrologist can determine a landscape/ watershed’s ability to handle water. Factors include elevations for snow influence, typical rainfall events, soil porosity, water sinks/ or holds (Lakes, swamps) and forest cover. The hydrologist can determine the amount of forest cover that can be removed without impacting the landscape’s ability to handle water. and develop curves to determine when a recovering stand will start to influence hydrological recovery.

Much of the HGLUOO targets of hydrological recovery were set by Glynnis Horel during the development of the Great Bear Rainforest Land Use Order and adopted into the HGLUOO. In determining hydrological recovery curves to be utilized for TSR calculations and for the HGLUOO analysis, Bill Floyd’s curves for recovery were utilized, therefore much of the analysis work utilizes “Floyd’s curves”. Where Taan or other licensees have had a qualified hydrologist develop new curves for a watershed, they are utilized for that watershed instead of Floyd’s curves (Horel, Milne).

Basic recovery calculations utilized in this analysis are:

## Upland Stream Sub-Unit Calculation

$$\frac{((\text{Total Hydrological Recovery Area of Sub-Unit} - \text{Type I and Type II Fish Habitat}))}{(\text{Total Area of sub-unit less Type I and Type II Fish habitat})} \times 100$$

## Sensitive Watershed Calculations

$$(\text{Total Hydrological Recovery Area of Sensitive Watershed} / \text{Total Area of Sensitive Watershed}) \times 100$$

## Watershed (FSC)

$$(\text{Total Hydrological Recovery Area of Watershed} / \text{Total Area of watershed}) \times 100$$

Due to the sheer number of individual stands, varying degrees of stand development, growth of trees, new development area and numerous boundaries and zones a GIS analysis is completed to determine hydrological recovery.

## Creating Spatial Dataset

The hydro recovery analysis requires creating a dataset made up of overlaying the following layers:

- Latest forest cover layer
- Watersheds (including Schedule 7 Sensitive Watersheds)
- Schedule 6 Upland Stream Subunits
- Type 1 & 2 stream buffers
- Relevant Tenure layer

## VRI Update

If using VRI Vegcomp layer for the forest cover component of the hydro recovery analysis a Non-Productive attribute is required. All polygons that are non-productive natural are considered 100% recovered, as NP polygons are all they ever will be, they have no chance of contributing more. VRI no longer has a single NP field as they used to. Silvacre is presently using the following criteria to determine what is NP (Jeff Mosher & Ken MacPhail determined these definitions).

**BCLCS\_Level\_1 = 'N' AND HARVEST\_DATE IS NULL**

**BCLCS\_Level\_2 = W, N (water, non-treed)**

**BCLCS\_Level\_3 = W, A (wetland, alpine)**

**BCLCS\_Level\_4 = Everything except the TC, TB, TM AND HARVEST\_DATE IS NULL**

**BCLCS\_Level\_5 = Everything except DE, OP, CL, SP AND HARVEST\_DATE IS NULL**

**SITE\_INDEX <= 10 AND HARVEST\_DATE IS NULL**

**Nothing with a harvest\_date should be NP.**

## UPDATING AGE & HEIGHT

A new field in the VRI is required to be added for stand age. If there has been any logging since the last VRI update it will need to be depleted and have this age field updated accordingly. Also, depending on what year the VRI data has been projected to, the years of growth may have to be added to the “Age” field. For example, if the Projected\_Age field was 2 years past, then the trees should be aged by 2 years.

After the ages have been updated, the height field can be projected. Height is required to determine hydro recovery percent based on the Floyd method (or other curves). If the forest cover has been projected recently this step is not required. Any blocks that are depleted must have the height updated to reflect it has been logged. A table has been created that uses leading species, age & site index to project the new height. A new field must be created with these 3 fields concatenated into one. Leading species + Site index + Age. A join to the New Heights table you can update the tree height field. (note: the new heights table doesn’t include any records for polygons with SI < 8 but we are considering all with site index <= 10 to be non-productive, therefore 100% recovered, so not necessary. And the maximum age included is 100 but anything over 60 years is 100%, so also not necessary. There are no records for Alder leading polygons, there aren’t many, for these we used secondary species.)

## CALCULATING HYDRO RECOVERY PERCENTAGE

- All stands > 60 years are considered 100% recovered.
- All non-productive stands are considered 100% recovered.
- Using the height field, a join is done with the Floyd table to acquire the hydro recovery % of that polygon.

- The polygon area is multiplied by the hydro recovery % to give the hydro recovered area for that polygon.

Watershed_Name	Sensitive_Wi	Height_2018	Hectares	Hydro_Rec_Perc_201	Hydro_Rec_AREA_2018	Tenure
Beattie Anchorage Residua Yes		13.2	4.33653731085	84.62881	3.66995992137836	Taan
Beattie Anchorage Residua Yes		8.3	2.11529520105	55.86645	1.181740335847	Taan
Beattie Anchorage Residua Yes		8.3	4.30095920025	55.86645	2.40279322112807	Taan
Beattie Anchorage Residua Yes		18.8	7.5507529824	95.39522	7.20305741921704	Taan
Beattie Anchorage Residua Yes		23.9	2.75808691905	98.46379	2.71571691199086	Taan
Beattie Anchorage Residua Yes		29.9	4.94372107625	99.57776	4.92284670837764	Taan
Beattie Anchorage Residua Yes		13.2	8.5830069576	84.62881	7.26369665043409	Taan
Beattie Anchorage Residua Yes		29	3.7030322435	99.4875	3.68405420325206	Taan
Beattie Anchorage Residua Yes		18.8	34.7255633516	95.39522	33.1265275554982	Taan
Beattie Anchorage Residua Yes		12.4	5.25293491665	81.74032	4.29376581026144	Taan
Beattie Anchorage Residua Yes		13.2	11.7124246695	84.62881	9.91208561994428	Taan
Beattie Anchorage Residua Yes		11.2	2.56231770565	76.3587	1.95655248990417	Taan

## PARK AREA

Area summaries are done by watershed & subunit within the Licensees tenure. Any watershed or subunit that contains park area, the percentage of that watershed or subunit that the licensee has ownership to, they can claim that percentage of the park for hydro recovery. Take the licensee area within a watershed or subunit / total area of all tenures within that watershed or subunit to determine the park percentage available. You can use this percentage to add to the licensee’s area available.

## WATERSHED SUMMARY

Hydro recovery is calculated by totalling the hydro recovered area within the licensee’s portion of a watershed divided by the total area of the watershed available to the licensee (including park portion where available).

Watershed_Name	Sensitive_Wi	Taan_HR_Area2018	Taan_WS_Area	Hydro Recovery Percent
Awun River3	Yes	1921.66412383106	2257.00699690856	0.851421429558338
Baxter Creek	Yes	319.680550009787	320.191587707953	0.998403962759222
Beattie Anchorage Residual1	Yes	1762.10591864765	1806.13824181339	0.975620734810679
Beattie Anchorage Residual2	No	1498.6753672683	1589.03948413865	0.943132868772403
Begbie Penninsula Residual2	No	809.347283322668	919.507606066553	0.880196398575617
Begbie Penninsula Residual3	No	1355.34574776431	1374.73606811765	0.985895241419041
Begbie Penninsula Residual6	No	963.694787462533	1192.6978826124	0.80799572256448
Begbie Penninsula Residual7	No	1188.44606445462	1342.08685927195	0.88552097522162

Non-sensitive watersheds the area available for logging is anything over the 75% recovery required. Sensitive watersheds area available for logging is anything over the 80% recovery required. Sensitive watersheds are also capped with only 5% of the watershed that can be logged within a 5 year period.

## SUB-BASIN SUMMARY

Hydro recovery is calculated by totalling the hydro recovered area within the licensee’s portion of each sub-basin (less the type 1&2 buffers & lake area removed) divided by the total area of the watershed available to the licensee (less the type 1&2 buffers & lake area removed), including park portion where available. The sub-basin area available is the area over the 70% recovered.

basin_poly	Taan_SB_HR_Area2018	Taan_SB_Area	Subbasin Hydro Recovery Pt	Tenure
128	124.833090959323	141.607233399648	0.881544593184834	Taan
132	287.813533208561	293.622375055647	0.980216624002226	Taan
136	712.450782391188	790.001216346701	0.901835044869754	Taan
139	44.494849651453	44.4962770499996	0.999967920944373	Taan
142	438.419338244496	444.0244268481	0.987376621049	Taan
145	40.1772490312204	61.4783350498501	0.65351882087637	Taan

## **Haida Gwaii Licensees' FSPs Implementation Agreement**

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April 16, 2018

The undersigned Parties commit to working collaboratively and as per individual Forest Stewardship Plan (FSP Results or Strategies) to ensure the Haida Gwaii Land Use Objectives Order targets are met. In particular, FSP implementation as it relates to Cedar Stewardship Areas, Upland Stream Areas, Sensitive Watersheds, Ecological Representation and Marbled Murrelet Nesting Habitat. Individually and when required collectively, the Parties will conduct inventory assessments, determine proportional targets, and establish tracking and reporting mechanisms that demonstrate achievement of FSP Results or Strategies.


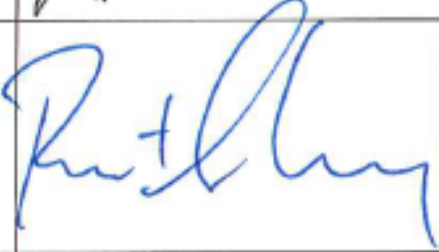

By signing this agreement, the Parties agree to work collaboratively to ensure:

1. Haida Gwaii Land Use Objectives Order targets are met consistent with Forest Stewardship Plan (FSP) Results or Strategies including but not limited to Cedar Stewardship Areas, Upland Stream Areas, Sensitive Watersheds, Ecological Representation and Marbled Murrelet Nesting Habitat. Within the TFLs, the targets will be based on proportional tenure area; while in the TSA, targets will be based on Allowable Annual Cut (AAC) apportionment.
2. The Licensees will complete analyses (independently for area based tenures, including FLTC A87661); or as a group for volume based tenures. Licensees will provide annual reports to the Province (MFLNRORD) and the Council of the Haida Nation (CHN). Licensees will report individually and as a group depending on the HGLUOO/FSP requirement.
3. Proposed development area information is shared at least annually with the effected Parties in shared Landscape Units ( e.g. watersheds, and/or watershed sub units, Cedar Stewardship Area harvesting).
4. Manage the cedar (red and yellow) harvest volumes as set by the Chief Forester's partition within the TSA.
  - a. The volume of cedar will be changed in accordance with new AAC determinations.
  - b. Each Licensee will submit to the Council of Haida Nation and the MLLNRORD, a cedar (red and yellow) harvest volume report for cedar harvested on TSA 25 in the previous calendar year consistent with the Chief Forester's cedar partition.
  - c. Individual Cedar Management Strategies will be provided by Licensees as to how each licensee will manage and report their portion of the partition.

The term of this agreement will be from the date signed and will remain in place for the duration of the licensee's FSPs approved in 2018, until such time as a new agreement is reached or the agreement is cancelled by the parties.

This agreement may be amended from time to time with mutual consent of the parties.

Additional Licensees may join this agreement with mutual consent of the parties.

Licensee	Authorized Signatory & Title	Signature	Date
Taan Forest Unit 3 Hwy 16 Commercial Cent Box 1384 Skidegate, BC V0T 1S1 Ph: (250) 559-2337 Fx: (250) 559-2367	Jeff Mosher, RPF Planning Manager		April 16, 2018
Husby Group 6425 River Road Delta, BC V4K 5B9 Ph: (604) 940-1234 Fx: (604) 940-1236	Rob Sandberg, RPF VP Forestry & Engineering		APRIL 16, 2018
A&A Trading Ltd. 1210-1111 Melville St. Vancouver, BC V6E 3V6 Phone: (604) 684-2107 Fax: (604) 689-0977	Dave Marquis, RPF Forestry Manager		April 16, 2018



## **Taan Forest 2018 Haida Gwaii TSA 25 Cedar Harvest Management Strategy**

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Within the Timber Supply Area 25, 195,000m<sup>3</sup> of cedar (red and yellow), based on the current AAC for the TSA, has been partitioned for harvest. In conjunction with a cedar management strategy the partition is to ensure focused and measurable cedar management to achieve a more robust and sustainable socioeconomic return for the people of Haida Gwaii.

The current AAC of the TSA of 512,000m<sup>3</sup> has a cedar partition of no more than 195,000 m<sup>3</sup> of cedar (red and yellow). Licensees and BCTS within the TSA area have signed an implementation agreement for their respective FSP's and have agreed to ensure the 195,000 cedar partition is not exceeded.

Licensees are managing their allocation of cedar, based on the percent volume or AAC in the TSA separately.

Within the TSA area, Taan has an area based tenure known as the Haida Tenure. Taan Forest is committed to ensuring this partition is not exceeded within the Haida Tenure.

The current AAC in the Haida Tenure Area for Taan Forest is 120,000m<sup>3</sup> with a cedar partition of 45,703m<sup>3</sup>. The cedar allocation of 45,703 m<sup>3</sup> will change with changing AAC determinations.

### **Cedar Management:**

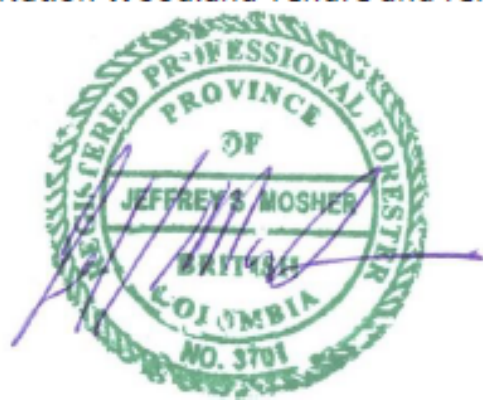
#### **Maintaining the partition within the Haida Tenure:**

Taan proposes the partition allocation within the Haida Tenure be managed over a 5 year period

- The 1<sup>st</sup> 5 year period starts January 1, 2018. This is to simplify reporting and tracking of HBS volumes versus November 1, 2017 as per the Chief Forester's October 24, 2017 cedar partition letter to the HGMC.
- The actual rate of harvest of cedar in any given year is no more than 10% above the allocation of 45,703m<sup>3</sup>
- In a five year period the volume of cedar harvested cannot exceed 228,515m<sup>3</sup>
- Any undercut cedar volume in a year can be carried forward
- Cedar (red and yellow) numbers are based on date of scale by licensed scalers as submitted to the Ministry's Harvest Billing System
- All reportable cedar harvest numbers include waste and residue numbers
- Taan will maintain a ledger of cedar volume harvested by year within the Haida Tenure Area
- Taan will submit cedar harvest numbers within the Haida Tenure Area to the CHN by January 31<sup>st</sup> annually

#### **Duration**

This strategy remains in effect until the AAC for the FLCTS is re-determined or the FLC A87661 area becomes a First Nation Woodland Tenure and removed from TSA 25



**Jeff S. Mosher, RPF**  
**Planning Manager**



Appendix M: Training Requirement Matrix



Training Requirements Matrix

CONSIDER PRINTED COPIES OF THIS DOCUMENT UNCONTROLLED. CHECK THE INTRANET TO ENSURE YOU HAVE THE CURRENT VERSION.

Retrain Interval	Annual													3 Yr		5 Yr			N/A					
Course #	H01	C01	C02	C03	C17	C04	C05	C06	C23	C07	C08	C09	C17	C10	C11	C12	C13	C15	C16	C18	C19	C20	C21	C22
The following Training requirements apply to each position, whether filled by employee or contractor:	HaiCo Employee Handbook & Sustainability Statement	CMS Awareness Level 1 Training Package	Common SOP	Operations SOP	Log Marketing & Custom Cut SOP	Planning SOP	Hazmat SOP	EPRP SOP (supplemental where applicable)	Silviculture SOP	ERAP (Explosives)	Forest Fire Suppression Training Course (S10A)*	Emergency Drill (e.g., Spill, Fire)	Invasive Plants Training Pk.	CMS Awareness Level 2 Training Course	TDG Training Course	Blasting Ticket (WorkSafe BC)	Pesticide Applicators Certificate	Faller Certification (WorkSafe BC)	Pleasure Craft Operator Certificate (PCOC)	Small Vessel Operator Proficiency (SVOP)	Radio Operator Certificate (ROC-MC)	Marine Emergency Duties (MED) A3 Certificate	Basic Forestry Supervisor	Basic Incident Investigation
<b>Taan</b>																								
President	✓																							
Manager, General	✓	✓	✓	✓			✓	✓			✓	✓		✓										
Manager, Log Marketing; Log Marketing Assistant, Coordinator, Custom Cut	✓				✓									✓										
Supervisor, Harvesting	✓	✓	✓	✓			✓	✓			✓	✓	✓	✓								✓	✓	
Administrator, CMS	✓							✓				✓		✓										
Manager, Planning	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓								✓	✓	
Supervisor, Planning Contract	✓	✓	✓			✓	✓	✓			✓	✓	✓	✓								✓	✓	
Operations Forester	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓								✓	✓	
Assistant Engineer	✓	✓	✓			✓	✓	✓			✓	✓	✓	✓										
Assistant Forester/ Assistant Silviculturalist	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓										
Junior Crew	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓											
Quality Control	✓	✓	✓					✓			✓	✓		✓										
Accountant, Operations	✓	✓			✓			✓				✓												
Administrator, Office	✓	✓						✓				✓												
<b>Contractors</b>																								
Contractor Principles & Supervisors/ Foreman (Operations)			✓	✓			✓	✓		✓	✓	✓		✓	✓							✓	✓	✓
Contractors Principles & Supervisors (Planning & Other)			✓			✓	✓	✓	✓		✓	✓		✓	✓		✓					✓	✓	✓
Planning & Engineering Crew		✓	✓			✓	✓	✓			✓	✓	✓	✓										
Forestry/ Silviculture Crew		✓	✓			✓	✓	✓	✓		✓	✓	✓	✓			✓							
Falling Crew		✓	✓	✓			✓	✓			✓	✓	✓					✓						
Harvesting Crew, DLS Crew		✓	✓	✓			✓	✓			✓	✓	✓											
Driver, Log Truck		✓	✓	✓			✓	✓			✓	✓	✓											
Road Crew		✓	✓	✓			✓	✓			✓	✓	✓											
Driller / Blaster		✓	✓	✓			✓	✓		✓	✓	✓	✓	✓		✓								
Shop Crew, Mechanic, Warehouse Personnel		✓	✓	✓			✓	✓			✓	✓	✓											
Driver, Rock Truck		✓	✓	✓			✓	✓		✓	✓	✓	✓											
Driver, Fuel Truck		✓	✓	✓			✓	✓			✓	✓	✓	✓										
Boom Boat Operator		✓	✓	✓			✓	✓			✓	✓	✓					✓						
Crew Boat Operator																			✓	✓	✓	✓		

✓ = Training Required

Complete a Training Record Form for completed training and place on file.



## Training Requirements Matrix

### Notes:

- \* Indicates training is only required where applicable to specific job positions/ responsibilities
- <sup>1</sup>TDG training, blasting ticket, Pesticide Applicators Certificate, ERAP review is required only where applicable.
- <sup>2</sup>Invasive Plants Training for Road Crew only required for road maintenance workers
- <sup>3</sup>Forest Safety Council Basic Forest Supervisor and Incident Investigation training is strongly recommended for all Contractor Principles and Supervisors and is a requirement for SAFE certified companies
- <sup>4</sup>Contractors are expected to ensure that all workers have current fire-fighting training (S100 and applicable annual refresher training)
- Personnel conducting job titles on a temporary basis must complete training requirements for the temporary role.
- Additional training may be required where specified under contract agreements (e.g., Fire Training).
- CMS Orientation Checklist is also required for all new hires, including young workers. It may also be used to complete re-training where requested by a worker or where a Supervisor deems re-training is required.
- First Aid Attendants also require Level 1 with Transport or Level 3, per First Aid requirements (WorkSafe BC). First Aid Level 1 training or Marine First Aid basic level is required for anyone with an SVOP certificate.
- Driver's License classifications and Air Brake Certification required where applicable (e.g., Air Brake Endorsement Certificate Code 19 Highway).
- This matrix describes the training that is required under Taan's Corporate Management System (in addition to legal requirements); Contractors are also responsible to ensure that any training required under specific safety programs is also completed and documented (e.g., policies, job safety breakdowns, safe work procedures, etc.).

TO ENSURE YOU HAVE THE CURRENT VERSION.